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FIELD STUDY IN INDUSTRY FOR THE PREPARATION OF INDUSTRIAL
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DESCRIPTORS- *INDUSTRIAL ARTS, *TEACHER EDUCATION, INDUSTRIAL ARTS TEACHERS, COURSE DESCRIPTIONS, PRESERVICE EDUCATION, INDUSTRIAL STRUCTURE, SCHOOL INDUSTRY RELATIONSHIP, MATERIAL DEVELOPMENT, *INDUSTRY, *CURRICULUM DEVELOPMENT, INDUCTIVE METHODS, FUNDAMENTAL CONCEPTS, CONCEPT FORMATION, STUDENT SEMINARS, *FIELD EXPERIENCE PROGRAMS, RESOURCE UNITS, STUDY GUIDES, GUIDELINES,

THE OBJECTIVES OF THIS PROJECT WERE TO DEVELOP A COURSE MODEL AND THE ACCOMPANYING INSTRUCTIONAL MATERIALS FOR AN INDUCTIVE STUDY OF THE NATURE AND ORGANIZATION OF INDUSTRY IN AN UNDERGRADUATE INDUSTRIAL ARTS TEACHER EDUCATION PROGRAM. A STRUCTURE FOR A MODEL CURRICULAR COMPONENT WAS CREATED AND TESTED ON FOUR STUDENT GROUPS DURING 2 YEARS. PHASE I CONSISTS OF 1 WEEK OF ON-CAMPUS ORIENTATION SEMINARS COVERING (1) INDUSTRIAL PSYCHOLOGY, SOCIOLOGY, AND ECONOMICS, (2) HISTORY OF INDUSTRY AND LABOR, AND (3) INDUSTRIAL ORGANIZATION. PHASE II CONSISTS OF 6 WEEKS OF CONCENTRATED STUDY AND OBSERVATION OF INDUSTRIAL RELATIONS, ENGINEERING, PRODUCTION, LABOR, FINANCIAL CONTROL, AND MARKETING. PHASE III IS DEVOTED TO 2 WEEKS OF ON-CAMPUS CURRICULUM DEVELOPMENT WORKSHOP WHERE MAJOR CONCEPTS AND INFORMATION GATHERED DURING THE INDUSTRY PHASE ARE DEVELOPED INTO RESOURCE UNITS. A STUDENT WORKBOOK, 206 LESSON TOPICS, 42 SEMINAR RESOURCE UNITS, A GUIDE FOR COOPERATING INDUSTRIAL PERSONNEL, AN INDUSTRIAL CONCEPTS TEST, AND A PROCEDURE FOR CONCEPT IDENTIFICATION AND TABULATION WERE DEVELOPED. THE COURSE REQUIRES AN INSTRUCTOR-COORDINATOR AND AN INDUSTRIAL COORDINATOR IN EACH ESTABLISHMENT UTILIZED IN THE COURSE. THE EXTENSIVE APPENDIXES INCLUDE ADMINISTRATIVE FORMS AND LETTERS, A PROGRAM SCHEDULE, AND 21 SEMINAR RESOURCE UNITS. APPENDIXES D THROUGH K ARE IN VT 005 277. (EM)

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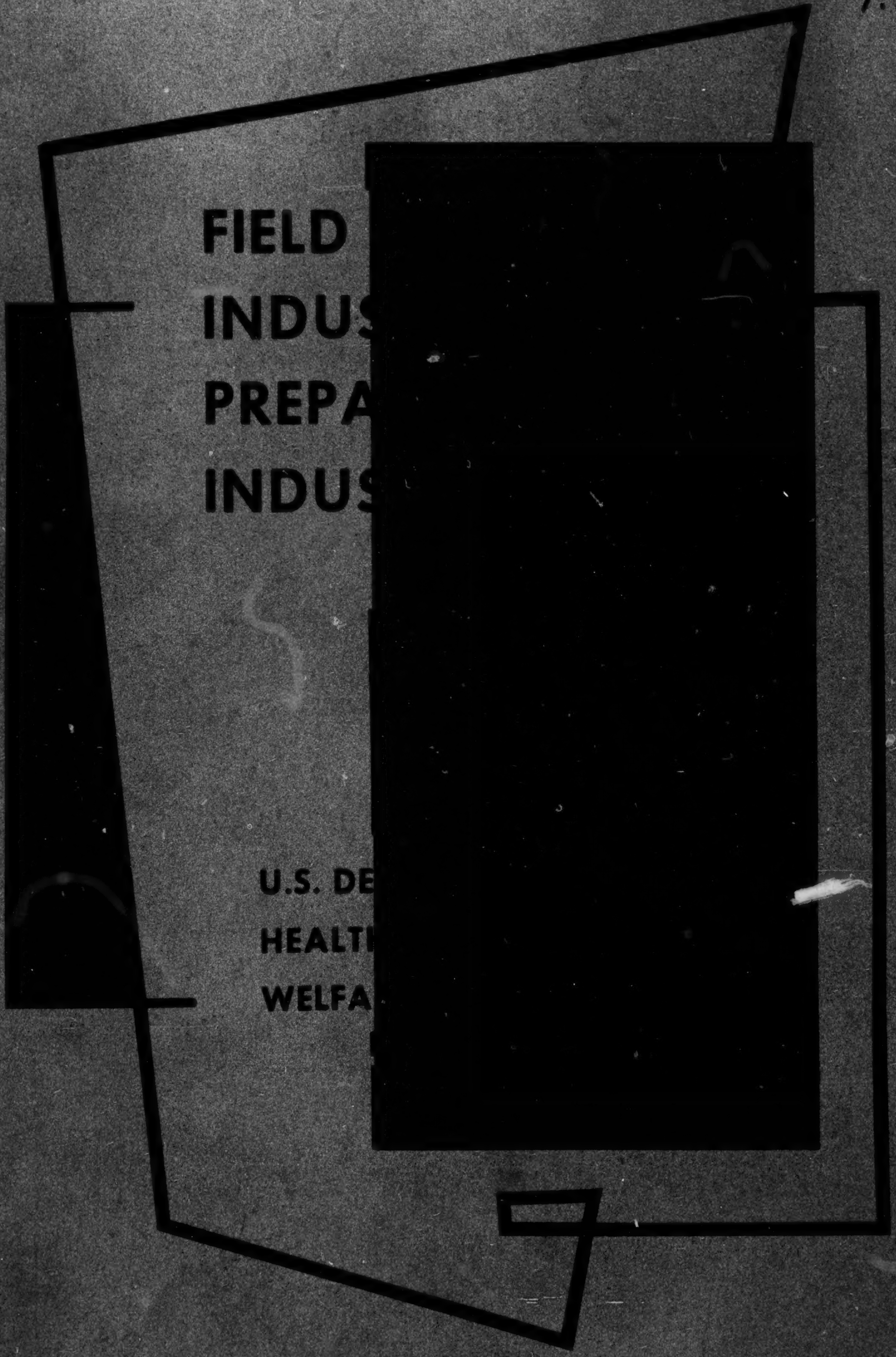

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FIELD STUDY IN INDUSTRY FOR THE PREPARATION OF INDUSTRIAL ARTS TEACHERS

FINAL REPORT
PROJECT NO. H-286
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FIELD STUDY IN INDUSTRY FOR THE PREPARATION OF INDUSTRIAL ARTS TEACHERS

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Dr. James R. Hastings, Project Director
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August 1967

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DIRECTED FIELD STUDY IN INDUSTRY

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INTRODUCTION

Dynamic and rapid changes have taken place in our society within the last decade and the future promises an ever increasing rate of change. Many of these changes which are influencing our culture are attributed to the rapid advancements in our technology (47:25) (10:208) (23:2-5). Industry represents one of the major elements of our technological society and as such must be recognized as a major societal institution which should be understood by those in education and, most particularly, by the teacher of industrial arts.

It may be stated that almost without exception, leaders in the field of industrial arts education have been in agreement for the last fifty years that industrial arts should consist of a study of industry, and that since industrialization is a major factor in our society, it should be included as a segment of general education. Although this philosophy of industrial arts has been generally accepted, it is also recognized that teachers who are being prepared for the public school systems and who will be responsible for the development of understandings and concepts about industry in their students are largely oriented to the technical and manipulative aspects of their field. It is imperative that teacher education institutions reorient their philosophy and curriculum to effectively prepare their graduates to interpret more broadly the total concept of industry as it exists and functions in our society.

The Problem

Most college students who are preparing to become industrial arts teachers, in general, have had very little if any exposure to or direct experience with the complex organization and processes of contemporary industrial technology. Teachers who are to be responsible for interpreting and giving meaning and understanding to public school students of the many complex phases of industry need to be exposed to industry at a level which will provide opportunity to gain insights and acquire those broad concepts about industry which will enable them to interpret effectively the social, economic, psychological, technical and organizational concepts of American industry. Such experiences are not presently a prerequisite for admission into professional industrial arts teacher education curriculums, nor are there frequently found any formally-organized college courses designed to develop in the mind of the prospective teacher an integrated framework of concepts necessary for understanding our industrial technology.

Purpose of the Study

The Directed Field Study program as conceived and carried out in this study has been concerned with two major aspects of the problem of preparing industrial arts teachers who are capable of adequately fulfilling their responsibility in the public school.

The first aspect of the study has been to develop the model and corpus of materials for a program which can be implemented in an undergraduate teacher education curriculum through which the teaching candidates may be exposed to the broad operative structure of industry. An essential ingredient of this exposure is the utilization of resource personnel from other educational disciplines, from business and from industry, who can provide information and first-hand knowledge in such areas as: industrial sociology, history of industry and labor, industrial psychology, industrial organization and management, economics and labor. The importance and need for this has been emphasized by Olson (85:236) Evans (63:31) and others in a number of studies and articles during the last few years.

The second important cognitive aspect of the program is concerned with the inductive development of the students' awareness and understanding of the broad integrated conceptual framework of American industry. This conceptual framework, which each student is able to develop will enable the prospective teachers to present a more meaningful approach to the comprehensive interpretation of the industrial-technological fabric of our culture to public school students in the classroom. This identification of a conceptual structure as proposed by Phenix (71:140) Bruner, Goodnow et. al. (12:12-13), and Kaplan (28:48) should provide the future teacher with a fundamental basis for a less restricted and less purely technically oriented approach to the selection of instructional content.

Objectives of the Study

The following specific objectives of the study were identified to accomplish the purposes of the project described in the problem under investigation.

1. To develop, refine and describe in procedural form a curricular model for a directed field experience in industry that would have the following distinctive features:
    a. The integrated utilization of specialists from other educational disciplines and industry
    b. A structural conceptualization of the nature and organization of American industry.
2. To develop and produce the following materials for use in replicating a similar program in other industrial arts teacher education institutions:
    a. A college instructor's guide to the program
    b. A student workbook
    c. A guide for personnel in industry who would be working with a program of this type

d. A selected list of text materials and resources essential for the proper conduct of the program.

3. To identify a body of commonly recognized key concepts relating to industrial technology which industrial arts teachers need as a structure to guide their teaching.

4. Development of a test of understanding of industrial concepts.

The guides and materials produced as a result of the experimental development, evaluation and review of the program over the two year period will be found in Chapter III of this report. Much of the detailed information collected and developed for use by college instructors and students because of its nature and quantity has been assigned to the appendix rather than made a part of the body of this report.

CHAPTER I

REVIEW OF RELATED RESEARCH AND LITERATURE

The fundamental premise upon which industrial arts was established as a subject in the school curriculum has been the study and interpretation of industry. This has been a primary concern of industrial arts teacher educators for the last half century. Richards in 1903 referred to the content as "the elements of industries fundamental to modern civilization, and to the development of insights into the basic industries of our time" (7:24). Since 1903 numerous studies have shown a consistent emphasis upon the development of an understanding of industry as one of the primary objectives of this curriculum area (44:11-15).

Although the industrial arts profession has been aware of the vast technological changes taking place in our society, there has been little change in emphasis in the curricular structure or in the approach to the preparation of teachers. This observation is made by Hostetler in the Washington Conference Report (44) in his statement:

> The first 50 years of the present century produced the most spectacular technological growth in the history of our country. Fifty-eight percent of the people industrially employed today are working at jobs that did not exist 50 years ago. Automobiles, airplanes, refrigerators, radio, television sets--just to name a few--are products of the first half of the century. While the technological changes have been phenomenal, industrial arts education which, according to Bonser, "is a study of these changes" has progressed at a much slower pace (44:11).

The post World War II study by Warner and others (91) and the more recent study by Olson (85) represent the first proposed new departures in curriculum structure. These studies, in addition to proposing a new structure based on categories of industries such as: communications, transportation, manufacturing, power, construction and industrial management, also place more emphasis on the total study of industry. These studies are reflective of a new philosophy and approach but still leave the problem of how to prepare teachers to implement the philosophy largely unanswered. The historical study by Sredl (87:280) draws attention to the fact that there are two differing philosophies evident in the field of industrial arts, one based primarily upon an analysis of content largely oriented toward a study of operations and processes, and the other based upon a concern with the general education contribution which can be made to our society. This latter philosophy is reflected in the content and approach suggested by the Warner and Olson studies and the monograph by DeVore (95). Sredl further points out that the philosophy and objectives deriving from a materials and occupations-oriented point of view seem to have dominated the field. This influence accounts for the technically-oriented approach from which most industrial arts teacher education programs have been developed. This emphasis has caused industrial arts personnel in the past to be prepared for teaching primarily the manipulative aspect of their work with very little attention given to the holistic structure and organizational elements of industry and the other understandings which contribute to the general education of the student.

In spite of the diverging philosophies mentioned, leaders in the field have come to a fairly general agreement on the stated objectives for industrial arts. The four objectives arrived at during the Washington Conference in 1960 (44:19) were used as a basis for this study. These objectives are:

1. To develop in each student an insight and understanding of industry and its place in our culture.
2. To discover and develop talents of students in the technical fields and applied sciences.
3. To develop technical problem-solving skills related to materials and processes.
4. To develop in each student a measure of skill in the use of the common tools and machines.

The primary purpose in developing the teacher education curricular model represented in this report has been to strengthen the prospective teachers' ability to interpret industry as it actually exists as referred to in the first objective.

Industrial Arts Teacher Preparation

The problem and need for preparing industrial arts teachers to interpret industry in a comprehensive manner has been recognized for several years but there has been little evidence, until recently, that any positive steps are being taken by teacher educators to revise their practices to accomplish this (2:106).

The shortcomings of the general industrial arts curricular offerings throughout the country as reflected in the curricular guides being used in the various states are pointed out by Schmitt in the report resulting from the national survey carried out by the U. S. Office of Education (46:66) when he states:

> The instructional topics emphasized most for industrial arts were those dealing with; (a) project planning, (b) hand tool techniques and machine processes, (c) technical information dealing with properties of materials and industrial processes, and (d) occupational information.
>
> Less emphasis is placed on topics that relate to modern industrial developments and problems such as automation, jigs and fixtures and other mass production devices, consumer problems, new products and processes, . . . and human relations.

As a result of this investigation and analysis of instructional content, a number of recommendations were made which are of significance to the nature of the program as developed for this study. Schmitt states:

> Instructional content as taught in the industrial arts laboratory should relate more directly to modern industrial developments and the basic problems of industry.... What the student does in the industrial arts laboratory ought to be related to the significant technological problems such as mass production, improvement of product design, research and development, new machines and processes, uses for new materials, labor utilization, management, automation, safety and communications (46:68-69).

Clearly, the outdated and narrow content reflected in the survey and the recommendations made call for a radical new emphasis and approach to the preparation of teachers if the recommendation is to be implemented.

Almost twenty years ago Wilber (78:22) in his report to the American Vocational Association on the various qualifications and experiences which an industrial arts teacher should have, commented:

> But what is the purpose of this technical preparation? Is it to develop our prospective teachers to a point where they can go out and transmit these skills to others? The end result must be to bring these young men to a point where they can interpret our industrial civilization to their students. How well this is being done is a question. A considerable number of men are probably being graduated who have never been employed in a manufacturing industry. They know little if anything about industrial organization, labor union activities, time and efficiency studies or production practices. Somewhere in the program they must be given this very essential information.

The concern for the manner in which industrial arts teachers are being prepared and the type of information and experiences which they should receive in their pre-service educational program has not been confined to those within the profession. Brasted, director of the education department of the National Association of Manufacturers, in addressing a national convention of the American Industrial Arts Association in 1950 on the subject stated:

> Industrial arts teacher training, at least on the undergraduate level, should be conducted in close cooperation with industry. Student teachers should have an opportunity to develop their own skills to the maximum by actual work in industry. They should have an opportunity to get a clear working understanding of industrial organization, management, and operation. Teachers of industrial arts need a realistic knowledge of the conditions their students will work under when they leave school; they need to know, first hand, about labor management problems. They must know the facts about production requirements and industrial economics, and about labor regulations and labor laws (93:4).

Pursuing this point further, Brasted emphasized the need for extending the education of industrial arts teachers beyond the undergraduate level in his comment:

> Industry and education need to get together at the teacher training level. And this close contact should continue after the students assume their teaching, supervisory, or teacher-training jobs, not only for the purpose of maintaining skills and to keep

> abreast of constantly changing manufacturing practices, occupational information and employment needs, but also that teachers may be constantly alerted to the total industrial-economic structure of the nation (93:5).

Wide-based support for the ideas presented in the foregoing statement would be forthcoming from industrial arts teachers and supervisors from the evidence obtained in the state-wide study of the in-service education needs and interests of industrial arts teachers by Hastings (83:146). Teachers expressed a high degree of interest in a course or program which would allow them academic credit for study and time devoted to investigating current industrial technology. Unfortunately, colleges and universities have shown little interest in the past along these lines as evidenced by the lack of such courses or opportunities available to teachers. Certainly there are advantages in such cooperative efforts both to the educators and to industry as reflected in the statement of the National Association of Manufacturers Educational Advisory Committee (37) which has a bearing on this study.

> Many teachers, while recognizing industry as vital in the world in which they live and about which they teach, have little or no knowledge of industrial problems or the contributions of industry to public well being beyond what they have learned from books. To them, production lines, inventories, amortization labor relations, risk capital and even industrial competition are abstract terms. The unfamiliarity of educators with what industrialists are doing and are trying to do undoubtedly is as great as industry's awareness of education's problems, objectives and accomplishments.... It is largely educators who appraise for young people the social system they are about to inherit. If the appraisal of industry is to be based on sound knowledge, actual observations, and shared experience, industry must maintain a continuous open house to education and make its hospitality evident and sincere (37:20).

Some eight years later, the Minnesota Plan for Industrial Arts Teacher Education (34) was structured from a thorough study and development of basic assumptions related to the critical areas of concern to the industrial arts teacher according the the following categories:

1. Assumptions related to the social, economic and technological forces at work.

2. Assumptions relating to education, including teacher education.

3. Assumptions relating to general or liberal education.

4. Assumptions related to industrial education.

In this last category one of the key assumptions having direct relation to the current study states:

> As a part of their training, industrial arts teachers will be required to have more direct work experiences in industry. This will be supplemented by planned and organized visits to industry as a part of the curricular program (34:25).

Many of the other assumptions made in this study also bear significantly on the general purpose of this program but do not point so directly to the kind of experience for undergraduate majors as provided for in the program herein described.

The competencies needed by the industrial arts teachers of the future also received careful examination in the Washington Conference report. Specifically, it was recognized that industrial arts teachers must become professional students of the technological aspect of our culture. Not only must they be aware of the applications of mathematics and science but they must also become well oriented in the social and behavioral sciences with particular emphasis upon economic and industrial history and geography, industrial sociology and industrial psychology. A particularly significant observation as it relates to the Directed Field Study Project is contained in the following statement by Karnes:

> Study here must involve a great deal more than simply delving into books and research reports. The kinds of competencies engaged here can be achieved in large part through study in the school sense but genuine insight and competence demand that the industrial arts teacher have actual experience in the technological aspect of the culture (44:59).

An examination of research reported in the area of student teaching, the area where the Directed Field Study as a professional laboratory experience belongs, in the Review of Educational Research, The Encyclopedia of Educational Research, Gage's Handbook of Research on Teaching, and yearbooks of The

Association of Student Teaching, revealed no studies having a direct relationship to this study. The literature of the field however, reflects a growing concern for the need to experiment with new kinds of experiences for the student teacher and to make more provision for individual differences (40:49-50).

The Field Study Project is an organized effort to overcome these two major criticisms directed at the student teaching experience as it applies to industrial arts teacher preparation.

Considerable guidance in the planning and development of the Field Study was obtained from the results of research conducted in the behavioral science field using field studies and experiments (19:Ch. 2-3-10).

Study of Industry as Basis for Curriculum

More recently there have appeared, in professional journals and conference papers, a number of encouraging proposals for the revision of the content and curriculum structure of industrial arts. Swanson (3:54) summarizes these proposals for the study of industry into three broad categories.

1. A division into its functional parts.
2. A division by principal products, services and/or materials.
3. A study of the forces generated by industry.

There is yet a further dimension to the question of how industrial arts teachers should be prepared as shown in the examination of the subject by Brown (58:13) wherein he points out that there exist two ideas for an instructional program within the industrial arts concept. The first sees the function of industrial arts as the interpretation of industry. The second identifies industrial arts as the study of technology.

It should be noted that it was not the concern of this study to attempt to develop a total curriculum structure. It was important, however, in developing the program being reported upon to take cognizance of differing philosophical views. This was necessary in order to create the type of teacher education experience which would enable the graduate to implement better the ongoing program and hopefully modify and adapt it to the prevailing philosophy of industrial arts as it develops in the future.

A number of studies representative of the various viewpoints were examined and the pertinent points extracted for use. Studies that proposed the study of industry as a primary basis for content included those by Swanson, Face and Flug (3:60-72), which is concerned with a conceptual framework. The study by Stadt (88:90) presents a critical analysis of other studies and suggests a proposal for the study of the forces influencing industry rather than a total curriculum pattern of study. The article by Bateson and Stern (57:3-16), based upon the research study completed by Stern (89), identifies the basic elements which are considered to be common to all industries, namely: research, product development, planning for production, manufacturing, and servicing of industrial products. Drawing upon the judgements of a large number of management consultants and a screening of commonly accepted texts, Stern attempted to describe the major elements of goods-producing industries in what might be referred to as conceptual statements. No attempt was made, however, to show how these elements of industry might be structured or integrated into a meaningful learning experience for students aware of these elements.

The research by Blomgren (81) centered on four critical areas of knowledge considered important to the proper understanding of industry. These were identified as:

I. Historical Development of American Industry

II. Labor Force and Organization in American Industry

III. Managing American Industry

IV. Technology of Production in American Industry

From the content outline developed around these four areas, a test of understanding of American industry was constructed and validated. This test was used as a pre-post test evaluation instrument in this program to attempt to assess the gain in understanding of industry by the students participating in the program. A similar study which made an analysis of the industrial management concepts which have implication for industrial arts education was completed by Larsen (84). Management-concept statements were derived in the following categories: personnel management, the functional organization, research and development, management trends, and international management development. From the categories mentioned twenty-eight selected principles of industrial management were derived. The use of conceptual statements to give meaning and understanding to industrial management are very similar, in many respects, to the conceptual statements resulting from this investigation as shown in Chapter III and Appendix G.

While Larson's study represents a very thorough examination of industrial management, the conclusions and recommendations are directed toward the public school program and only indirectly at the problem of preparing the industrial arts teacher to carry out the recommendations made in the study. Two recommendations are significant, however, as they relate to the purpose of this project.

> It is recommended that the teacher education institutions and/or the professional organizations in industrial arts accept the responsibility for establishing pilot model programs in industrial arts education. Such experimental programs are needed in order to test new ideas such as utilizing industrial management concepts in instruction.
>
> The teacher education institutions should be cognizant of the need to prepare teachers with some background in industrial management concepts. It may be partially true that teachers will tend to teach the way they have been taught. Without such a background it is difficult for teachers to go beyond teaching the manipulative aspects of industry (84:309).

Other writers such as Carroll (62:22), Hackett (66:25-28), Evans (63), and Schorling (74) all refer to the body of instructional content represented by our vast industrial technology and the imperative need for ordering this content around an organized structure that may be taught in a meaningful manner. Evans (63) differentiates the approach and emphasis which should be made in this content for industrial arts in his statement:

> Rather, industrial arts general education should turn for its content to the industrial sociologist, the economist, the industrial psychologist, the industrial anthropologist, the specialist in industrial organization, the specialist in labor management relations, etc. A specialist in industrial engineering should be included, but he should not be a man who is employed as an industrial engineer. Rather he should be (as should all of the other subject-matter experts on the team) a person who makes his life work to study, rather than practice his speciality. These people will not be concerned with the minutiae of daily operating decisions. Rather, they will be concerned with the structure of industry and the identification of principles of industrial life. It is this structure and these principles which should make up the content of industrial arts general education (63:31).

It is this interdisciplinary approach referred to in the previous statement which contributes most to the development of industrial arts content which will give it a character more truly general-educational in nature and representative of its stated goals and purposes. It is along these lines that those who envision a curriculum structure based upon a study of technology are in most agreement.

The two published monographs (95) (96) and the conference paper by DeVore (94) provide a further extension and exposition of the philosophical position held by Olson and others. DeVore's writings have endeavored to establish the content of technology as an intellectual discipline which can provide the basis for a curriculum structure having internal stability with external flexibility enabling it to adapt to change. DeVore views such a curriculum as composed of two major elements: the technical element and the social-cultural element. The technical element would then be subdivided into production, communications and transportation as the three major areas of study within the industrial arts curriculum. Each of the technical areas would also be considered as having common elements such as management, research, fabrication, product processing, and materials working (94:20-27).

The support for the approach and structure proposed is thoroughly documented from an extensive research in the general fields of curriculum and philosophy. DeVore observes that a structure is not a curriculum (94:17). It is at this point that progress in the direction proposed has been stymied. The approach outlined draws heavily upon a conceptual view of industrial technology and therefore represents a fusing of the philosophical basis of curriculum development and the taxonomical technical analysis necessary, in the long run, to produce a universally applicable curriculum.

It is regrettable that implementation of more of the curriculum structure and concepts proposed have not been possible at this point. Without pilot try-out of these ideas, acceptance and wide adoption will be exceedingly slow as pointed out by Rogers (41:305-314) since it represents an educational innovation.

A publication resulting from the combined study and efforts of a committee appointed by the Association of Consulting Management Engineers (4) was extremely valuable at a number of points in developing the program. This publication was developed to clarify concepts regarding the organization and responsibility of management in industrial establishments. No other source was found which presents the information regarding the basic elements and functions in an industrial or business establishment so concisely and diagrammatically. While much of the information contained in this source is more detailed and extensive than could be used by the industrial arts teacher, it does establish a very comprehensive framework upon which he can develop his concepts and instruction.

Two other federally-funded, large-scale research projects currently underway need to be recognized at this point for their relevance to the work conducted in this program. The Stout State University project was started prior to the approval of this project but the nature of its work was not known. A review of the first report from the project (82) reveals that their project was directed toward the development of a conceptual structure of American industry under the three principal headings of: production, management organization and service. While there are no published results from this study yet available, it is evident that several categories or elements of industry are being identified for study similar to those being used in the Field Study. In identifying concepts about American industry in the Stout State study, the preliminary information available seems to place emphasis upon a taxonomical analysis of industrial operations, materials and processes. However, the procedure for determining these is not described. Attention in this study is also directed toward concept identification with major emphasis being focused on the organizational and management phases of industry as investigated in the study by Larsen (84).

A review of some of the pilot curriculum materials produced as a result of the project, and an examination of the total plan to be carried out in the Stout program would seem to indicate that the curriculum structure and materials being produced hold real promise for providing a new posture for industrial arts in the future.

It is gradually being recognized that a study of many separate types of industries, such as metals or ceramic industries, cannot be justified if they do not add substantially to an understanding of modern industry (88:6). Students can gain a better understanding of industry if they understand principles which are common to all industries. It is becoming widely recognized that generalizations and principles which can be transferred to different situations are more valuable to the learner than specific manual skills. Commenting on this, Drucker states:

> .... The new skill is not manual, it is not a knowledge of tools or of materials. It is partly technical and partly theoretical: knowledge of principles and processes. Partly it is social: skill in the organization of men for work in a close group and in fitting together their operations, their speeds and their abilities (17:23).

In analyzing various industries for implications to determine curriculum content, Olson found that certain elements seemed to be common to all industries. They have patterns such as using or producing materials, processes, products, power machines and people. They also included research, engineering, marketing, management and maintenance divisions (85:98). When analyzed these and other elements could reveal content. He summarized his views regarding the use of common elements of industry for the identification of industrial arts content this way:

> Because industries of all kinds have common elements, common denominators as it were, these too may be used as a .... source in curriculum construction .... The use of such components as units or blocks of content is particularly suitable in studies intended to search out concepts, principles, theories and practices which characterize industry broadly and generally (38:258).

Mention also needs to be made of the extensive long range curriculum study currently in progress as a joint effort of the University of Illinois and Ohio State University. Information pertaining to approach, procedures to be used, and reported data from this study were not available during the operation of the Field Study. A conference presentation and a brief printed summary of the study being carried out at Ohio State University (90) indicate an approach to the study of industrial technology based upon praxiology with all industries grouped for study under the broad headings of construction and manufacturing. Content to be taught will be derived from an analysis made of the construction and manufacturing industries and prescribed on a rather rigid block time schedule for use by the public school instructors. While industry is the focus of both the Ohio State Curriculum Project and this Directed Field Study Program, their purposes are dissimilar and the divisions of industry used for purposes of study and development of curriculum materials is also considerably different.

There is general consensus among educational leaders that industrial arts must partially disengage itself from a total reliance upon the technical-manipulative aspect of the subject, important as these basic learning experiences may be. Providing teachers with the background understanding of a broader range of knowledge about industry can be of inestimable value in achieving this disengagement.

The industrial arts teacher of the immediate future must be prepared to provide his students with an entension of applications, meaning, and implications of technology in an industrial society. "This conceptual interpretation can be of the greatest significance to the student. The teacher cannot adequately discharge his duty if he does not himself possess the broad concepts and resources of his subject" (79:28).

From the review of the studies and literature presented, there appears to be ample evidence available to provide the guideposts for developing needed modifications in the curriculum of industrial arts.

While needed change can be recognized in many fields of human endeavor, the achievement of this change is yet another process. Rogers (41) documents the instances where change has not occurred due to the absence of that necessary key ingredient---the catalytic change agent which can set the process in motion.

Wide acceptance of any new idea is hard to bring about. Because of this, it is not surprising that in spite of the numerous expressions of theory relating to what new content and procedures industrial arts should adopt, there are very few concrete examples of provision having been made for a program that is curricularly sound and well enough defined for use in teacher preparation for developing the concepts and understandings called for in the proposals presented.

Hopefully, the type of experiences and the procedures outlined for developing a conceptual understanding of many industries in a relatively short period of time as described in this project can serve as one catalyst in the change process. In operation and structure it is believed to be compatible with the basic philosophy and current learning theory represented in most of the reported research.

Concept Identification

An important element of the Field Study project as stated in the third objective of this study is concerned with the attempt to identify key concepts useful to the future industrial arts teacher in the selection of content and in the guidance of his teaching procedures.

Reference has been made to the use of concepts in some of the more recent writing and research in the field of industrial arts by Swanson (100), DeVore (95), Larsen (84), Moss (70), Schorling (74), and Stern (89). It must be admitted that a vast part of the literature and research in the field makes little or no reference to concept identification, to instructional procedures, and to the type of learning experiences appropriate for developing concepts. Where the term is used there is some doubt whether there is any real meaning attached to its significance as a guide to curriculum development and teaching procedures.

This research project makes no pretense of conducting a scientific research of concept development. This aspect of the study is concerned with an experimental procedure for identifying concepts. Procedures have been established, however, to take advantage of the opportunity to employ the principles of concept identification and development which exist in the literature or have been derived from other studies. Hopefully, some of the data gathered and the experimental procedures used in this study to furnish undergraduates with curriculum development experience will provide thoughts and raise questions to be answered through additional research in this area by other industrial arts personnel.

It is appropriate therefore to review somewhat briefly, the significant statements, conclusions and principles dealing with concepts as they apply to curriculum development and learning as they relate to the work and procedures in this project.

From an examination of the writing and studies reported in such sources as the Encyclopedia of Educational Research, the Handbook in Teaching, the Journal of Educational Psychology, and Psychological Abstracts, it becomes apparent that much of the research has been done with pre-school children or with those at the elementary school level. Where studies were mentioned that had been carried on with college students or adults, they were conducted in a very controlled situation and were devoted in most instances to a measurement of the degree of concept identification, the process of concept formation, or the behavioral influence of concepts on the learner. The use of such techniques as card manipulation, abstract or nonsense symbols and other sensory stimuli were used extensively in order to measure the attainment of concepts as reported by Russell (42), Serra (75), Carner and Sheldon (61) and Heidbreder (68). Examination of the results of these studies and others, from the standpoint of the scientific procedures used, are unquestionably sound and the principles derived can be assumed to be applicable in similar situations (73:357-363).

In spite of a rather careful search of the literature and summaries of research in the area of concept development, very little information was obtainable that would apply directly to the type of procedure used in this study with college students attempting to identify concepts in industry where they are not in an artificially-controlled situation. The general principles pertaining to the ordering and structuring of concepts and the general principles of concept attainment contained in several sources were found helpful such as: Bruner and Goodnow (12:Ch. 3), Klausmir (31:Ch. 6), Klausmir (32:Ch. V), and Burton, Kimball and Wing (14:Ch. 9).

Definition of "concept"

As might be expected, there appears to be no universally accepted definition of the term concept. This is no doubt due to the large body of literature and experiments conducted to develop the theories relating to concepts. Good's definition of conceptual thinking states:

> The process of thinking in which abstract concepts are related without reference to concrete situations; the manipulation of linguistic or mathematical symbols in terms of their inherent logical relations (25:570).

In attempting a logical analysis of concepts, Harre (26:3-4) noted that "Concepts are vehicles of thought" and that "Concepts are involved with the means of thinking." Most of the writers on the subject acknowledge that concepts are connected first with images and secondly to language.

No exact definition seems to fit all situations, and therefore Burton, Kimball and Wing (14:154) submit several statements which seem to tell what needs to be known:

> A concept is a defined idea or meaning fixed by, and as extensive as, the term used to designate it.
>
> A concept is the amount of meaning a person has for any thing, person, or process.
>
> A concept is a suggested meaning which has been detached from the many specific situations giving rise to it and provided with a name.

After a comprehensive study of concepts and their formation and use as they might apply in curriculum planning, Woodruff (80) composed a definition which most nearly satisfied the purposes of this project for guidance.

> A concept may be defined as some amount of meaning more or less organized in an individual's mind as a result of sensory perception of external objects or events and the cognitive interpretation of the perceived data (80:84).

Concept Attainment

The definition adopted for use in this project is further supported by Willower (55) in his discussion of the importance and place of concepts in research. His observations become germane to this study when he notes:

> The development and refinement of more concepts in conjunction with empirical observations ought also to help close the theory practice gap, since concepts drawn out of events should have relatively clearer application to other events and situations (55:102).

This position is in general agreement with Griffith (25A:35) who points out that more use should be made of the observational approach of acquiring concepts similar to the approach used by anthropologists.

The procedure of having the students in the Field Study reflect on their ongoing experiences and observations to extract those concepts which they have been able to identify is again supported by Willower:

> .... Concepts are not automatically given in experience. Someone has to invent and refine them, and their construction is a complex human activity. Because of its creative, inventive aspects and because complexity is inherent in the formulation of high level abstractions... they are not easy to treat systematically (55:102).

He expressed in succinct form the sources from which concepts may be derived that are most important again to the development of concepts as applied to the procedures and results of the students' experiences in the Field Study.

> The construction of concepts may grow out of activities such as the observation and description of situations, the use of techniques like polarization and analogical reasoning, the discovery and analysis of gaps in theory, and the analysis of empirical generalizations. Threaded throughout are the elements of imagination, creativity, and insight (55:102).

The particular type of observation used in this experiment may be referred to as "directed" for the purpose of assisting the students to eliminate the many mundane and distractive elements in the industrial setting which, while of considerable interest to the students, would not contribute to their attaining a unified understanding of the industrial-technological complex.

Skolimowski (76) refers to this in his statement in this way:

> The art of observation is not universal but specific for a given field or subject matter. Whenever observation plays a significant role in scientific investigation, it is selective observation directed toward perceiving some objects and their configurations and toward neglecting others. Observation, however, is not only a perceptual process but also involves some conceptual thinking. Certain types of observation are intrinsically connected with thinking in terms of certain categories.
>
> In general, it seems to me that specific branches of learning originate and condition specific modes of thinking, develop and adhere to categories through which they can best express their content and by means of which they can further progress (76:378).

A critical aspect of concept attainment is the degree to which the individual can put the concept to use. This is referred to by some authors such as Brownell and Hendrickson (11:124-25) as the ability to generalize or state the concept verbally. Gagne (22:51) points out that in adults, this is more significant than in children. Some disagreement exists, however, concerning the desirability of verbalizing concepts in order to make them operate more effectively. It is generally recognized that in certain areas such as the technical, where the rather precise use of words is necessary to convey meaning, it becomes very important to verbalize the concept. Swanson (100) makes note of this problem, as it relates to industrial arts teaching, in his paper directed toward suggesting new content and teaching procedures when he states:

> Educators (industrial arts) often defer the teaching of certain concepts to later years because they think of them as too difficult for beginners. Evidence from other areas of education seems to indicate that the problem is not so much whether the concepts can be taught but how they can be phrased in terms appropriate to the development of the student and separated from the extremely technical details of their applications to complex situations (100:5).

The most important consideration for requiring the students in the Field Study to verbalize and write out their statements is referred to by Ausubel, who points out that verbalization does more than identify the concept when he states:

> Thus, when an individual uses language to acquire a concept, he is not merely labeling a new generic idea; he is also using it in the process of concept attainment to acquire a concept that transcends by far--in clarity, precision, abstraction and generality--the level of concept acquisition that can be achieved without the use of language (31:165).

A well controlled experiment by Gagne and Smith (65) strongly supports verbalization as a means of more firmly establishing the concept in the mind of the learner. This study showed that subjects who verbalized while they were learning tended to think of new reasons for their moves, to learn the general principles better, and solve successive problems better.

The criteria of what constitutes an adequate concept is also of particular significance. Willower (55) identifies the three criteria of adequacy as precision of meaning, linkability with other concepts, and utility. He points out that an operational definition aids in developing precision of meaning. This is a most important element in the concept statements derived in this study. In describing an operational definition he states:

> An operational definition requires that the observable conditions necessary for a concept's application be stated. The concept is said to be defined by the set of operations connecting it to conditions of operation (55:107).

Where concepts about industry are being developed this becomes a most worthwhile aspect of the statements.

Statement of concepts

In order to determine what concepts undergraduate students were able to identify from their study and observations in industry, it was necessary to have them state their concepts in writing in order that they might be examined and studied.

The question arose concerning how concepts should or could be stated. The explanation by Woodruff (80:88-89) provided the most clear-cut direction. Woodruff differentiates conceptual statements into two general classes for use in curriculum work. These two classes are referred to as (1) process concepts, and (2) structure concepts. In explaining these, he points out that process concepts become our most important objectives in education which is intended to influence behavior. Structure concepts seem to serve the purpose of providing patterns to follow in producing an end product such as a project or a drawing.

The unpublished conference paper by Woodruff (101) provides a more detailed explanation for the structuring of concept statements according to the two categories previously mentioned as follows:

Process concepts: A concept of a process, event, or behavior, and the consequences it produces when it occurs. This is its form:

$$\text{when}\left\{\begin{matrix}\text{this}\\ \text{or}\\ \text{these}\end{matrix}\right\}\left\{\begin{matrix}\left.\begin{matrix}\text{process(es)}\\ \text{behavior(s)}\\ \text{event(s)}\end{matrix}\right\}\text{occur(s)}\\ \\ \left.\begin{matrix}\text{circumstance(s)}\\ \text{quality(ies)}\\ \text{structure(s)}\end{matrix}\right\}\text{exist(s)}\end{matrix}\right\}\left\{\begin{matrix}\text{it}\\ \\ \text{they}\end{matrix}\right\}\begin{matrix}\text{will tend}\\ \text{to}\\ \text{produce}\end{matrix}\left\{\begin{matrix}\text{this result}\\ \text{or}\\ \text{these feelings}\\ \text{or}\\ \text{these conditions}\\ \text{or}\\ \text{these reactions}\end{matrix}\right.$$

Structural concepts: A concept of an object or structure of some kind, e.g., a physical object, a chemical structure, or a geographical unit. This is its form:

$$\text{this}\left\{\begin{matrix}\text{object}\\ \text{process}\\ \text{quality}\\ \text{idea}\\ \text{condition}\\ \text{place}\\ \text{organization}\\ \text{etc.}\end{matrix}\right\}\text{has these elements}\left\{\begin{matrix}\text{height}\\ \text{depth}\\ \text{width}\\ \text{number}\\ \text{substance}\\ \text{notion}\\ \text{time units}\end{matrix}\right\}\text{in this}\left\{\begin{matrix}\text{form}\\ \text{structure}\\ \text{configuration}\end{matrix}\right.$$

The need for conceptual statements to serve as a guide for the teacher may be summarized in this way. A concept cannot be transmitted from a teacher to a student directly. Until we have a clear conceptual statement: the teacher does not know what to show the student; the type of learning activity he should be exposed to; or where to focus attention (80) (12). Implicit in the meaning of this statement is the understanding which the teacher must hold that the student acquires the concept for himself as a result of the experiences to which he has been exposed (28:48-50).

In order for the individual to prepare a conceptual statement which is derived from a number of specific instances and observed phenomena, it becomes necessary for the person to synthesize and generalize. The provision of an educational setting and experience which can promote the process of generalization then is seen as of paramount importance to the attainment of this objective.

This particular principle is set forth by Glazer when he states:

> Generalization is a significant component of concept formation, and the influence of the analysis of subject-matter dimensions can be made more clearly when one considers the teaching of concepts. Many psychologists would agree that the basic procedure for teaching the ability to use concepts involves teaching the student to generalize within classes and to discriminate between classes (24:221-22).

In this connection, subject matter specialists will always be confronted with the disagreement among experts and the ever present problem of semantic imprecisions. Sometimes the distinction between categories or elements of a subject are not clear to the learner because he does not have the necessary background. This difficulty has been recognized in carrying out this research but the value of involving the college students in the process of discovering the formulating concepts for their own use in identifying a structure of knowledge about industry has been utilized to the fullest as supported by Townsend and Burke (52), Brownell and Hendrickson (11:121-24), Cronbach (15:341) and King (30:81).

The process of abstraction is referred to by Bloom (9) as involving the determination of commonalities, including the process of analysis and differentiation. The building of a concept requires both the process of abstraction and that of generalization. The process of abstraction isolates the properties which are the characteristics of the particular concept involved and the generalization recognizes the application of the concept to a wider set of data than that from which it was originally derived (9:155).

Use of concepts in curriculum planning

The publication of the report on the Wood's Hole Conference under the title The Process of Education by Bruner (12A) has focused attention on the importance and place of structure in education. The report is concerned with the psychology of learning but the most important point made is contained in his statement:

> Grasping the structure of a subject is understanding it in a way that permits many other things to be related to it meaningfully. To learn structure in short is to learn how things are related (12A:7).

Bruner emphasizes that education should permit the learner to go further more easily in the future through having acquired those general concepts and attitudes which are transferable. He states: "In essence, it consists of learning initially not a skill but a general idea (concept) which can then be used as a basis for recognizing subsequent problems as special cases of the idea originally mastered" (12A:17).

Bruner has most usefully pointed out the importance of establishing "structures" of knowledge so that the student can find meaningful relationships among comprehensive ideas, rather than have to struggle with countless facts in isolation (12A:31). This holds a valuable lesson for most of the conventional approaches which have been used in the industrial arts laboratory where students who have been able to memorize certain facts in a conceptual vacuum have been credited with having successfully learned about industry.

With the healthy concern which is being shown for seeking to discover and teach underlying conceptual structures in other areas of the school curriculum and in industrial arts, it should not be inferred that teachers and curriculum planners should be apologetic or attempt to unduly deemphasize skill development entirely, either. This is stressed by Friedlander:

> I think that at times we may have become cavalier and apologetic about how important it is for students to gain command over rudimentary facts and skills. I suspect that we have paid too little attention to the crucial role that facts and skills play in the way a student masters a body of knowledge so as to comprehend its larger significance. In aiming for the student to understand the abstraction behind what we think he should learn .... have we gone too far in deemphasizing the attainment of skillful performance, which in itself may be a principal means for attaining understanding (64:21)?

The fault in industrial arts educators' curriculum planning efforts and approach to teaching procedures may be identified as a too exclusive concern for the attainment of skills without maintaining a balance between their efforts in this direction and that of broader conceptual understandings. What appears to be missing is the recognition that skill in performing operations may often be the learner's key to comprehending concepts (48:73).

To date there has been too little effort or evidence to show industrial arts teachers what concepts are important to be known in their field and consequently their attention has been directed toward that which is more immediately observable and measurable. This has resulted by and large in too much emphasis being placed upon the object produced in the laboratory. Since the project represents tangible evidence, it therefore has become the main focus of instruction rather than larger concepts and understandings which are transferable. The educational usefulness of devices preparing students to manipulate concrete objects and then observe the consequences of their reactions, is beginning to represent a rediscovery of Pestolozzi's principles and is becoming more widely recognized and applied in teaching the physical sciences, mathematics and elementary science (64:22).

The curriculum development experience provided for within the framework of this project has attempted to provide the means of overcoming some of the shortcomings mentioned. It is hoped that this will be accomplished by encouraging undergraduate students participating in the program to focus their attention first on concepts which they consider important for the public school student to gain an understanding of and secondly proceed to select meaningful experiences for developing those concepts. Some of these experiences will involve the development of skills through manipulative activities.

The rapid expansion of knowledge in all areas has caused many educators to become concerned with the problem of how to cope with all the new information. Obviously some means of economy must be found. In discussing this problem, Phenix (71) suggests that by concept formation an enormous simplification of experience becomes possible whereby the muitiplicity of individual items and facts become caught up in general ideas. He suggests:

> By a careful analysis of the structure of knowledge it is possible to discover certain key concepts distinguished by their power to epitomize important common features of a large number of more particular ideas. Such concepts are basic central ideas, the understanding of which opens the door to an effective grasp of an entire field of knowledge. These key ideas provide, as it were, a map whereby the whole scheme of a subject may be grasped and characteristic features of individual items of knowledge may, for the first time, be rightly interpreted (71:140).

This statement holds particular significance for the field of industrial arts as it struggles to accommodate an ever-accelerating quantity of information in its field. The early identification of structure as suggested by Bruner and the identification of key concepts as suggested by Phenix could aid in the solution of the dilemma.

An attack on this problem has been made as it affects other fields such as science, mathematics, and social science, as reported in the ASCD bulletin, New Curriculum Development (23). While certain subjects have been fortunate in having extensive financial resources to carry out their research, it should not be presumed that the suggested conceptual approach to curriculum construction has been entirely successful in all cases, as pointed out by Novack (36:242-243). Sufficient information does, however, exist in the field of learning theory and psychology in support of this approach to warrant its serious study and consideration by industrial arts teachers and teacher educators in their efforts in this most critical intellectual endeavor of curriculum planning.

Learning principles and concepts

Within the framework of this educational experiment, it was incumbent upon the project staff to be concerned with a multilevel consideration of learning principles. First, the project was designed for college students and therefore had to employ principles and procedures applicable at that level. Secondly, the college students participating in the program had to be familiarized with the value and principles of concept learning which they would need to be cognizant of at the secondary school level in working with their own students.

Educational and psychological views on the meaning of the term "discovery" are in substantial agreement (64:27-28). Bruner calls discovery "a matter of rearranging or transforming evidence in such a way that one is able to go beyond the evidence so reassembled to additional new insights" (59:22). That definition incorporates Dewey's statement that the student's experiences with the raw material of what is to be learned generate data, from which he may then proceed to discover new ideas (16:Ch. 12) and Wertheimer's conclusion that productivity in thinking and learning rises out of the perceptual functions of grouping, centering and reorganizing the objective properties of a problem situation (53:Ch. 11).

The placement of undergraduate industrial arts majors in situations where they are required to assemble data for themselves and draw inferences from their observations requires the highest type of cognitive behavior as referred to by Bloom (9:155) as analysis and synthesis. This experience is also highly individualized and provides the maximum opportunity for the two most powerful concepts of learning to operate, namely, meaningfulness and motivation. Erickson (97) refers to these factors this way:

> Teachers could make much better use of the intrinsic motives that are released when the subject matter is fused with the student's own aspirations and values. The ability to start this learning chain reaction is probably one of the defining characteristics of the superior teacher .... conceptual ordering can be exciting and knowledge can be its own reward. This motivational state will most likely happen when the teacher gives the student the intellectual freedom to seek the information that will reduce his own uncertainty (97:30).

It is the purpose of the program to have the students challenged to find out for themselves the generalizations or inferences the subject matter contains as a product of their own thinking and manipulation of facts.

The principle that a student cannot be a discoverer and at the same time a passive observer applies to the teacher in training as well as to his own students. Having been exposed to this type of experience in their undergraduate work should provide useful guidelines for the prospective teachers for establishing similar learning experiences with their own students. A further value of this type learning experience is stated by Freidlander (64:28):

> Because of his own participation in developing what is revealed or resolved in the discovery process we expect that the student will retain his new knowledge more completely than he would retain a system of facts and ideas imposed upon him from the outside.

Acquiring a set of concepts, through his own discovery, by the prospective teacher becomes fundamental to his being able to design educational learning experiences for the development of concepts with his students which will involve both the technical and organizational elements of industry. This viewpoint is expressed by Moss in his article:

> These two phases .... significant representative technological processes and the problems encountered and functions utilized in producing or providing a profitable product or service .... comprise the industrial arts effort at the junior high school level to develop key concepts about industry as a whole. It should provide an excellent foundation for further, more abstract conceptual development at the senior high school (70:25).

In order that the prospective teachers might be made aware of the importance and value of assisting their students, through planned activities to acquire concepts of industry of their own, the results of the study by Face and Flug (82:11) were used for the eighteen generalizations and implications which were derived for the teaching of industrial arts. The conclusion of Bruner, Goodnow, et al (12:11) concerning the benefits of categorizing and the propositions affecting concept development by Burlingame (60) were made familiar to the students at the outset of the program.

In summary, the suggestions for curricular practice as outlined by Cronbach (15) served as operative guides for discussion and curriculum development activities as stated below:

1. The curriculum should provide repeated opportunities to deal with significant general concepts, each time at a higher level.

2. The sequence of instruction should observe the inherent order in which concepts rest on one another.

3. The method and aims of instruction should fit the learner with impressionistic thought encouraged early in the learning process and formal thought encouraged when it first appears, even though it is poorly formulated.

4. Intuitive, even crude, understanding is more to be prized than control without understanding.

5. Inexact solutions are a sign of progress toward better solutions.

6. Concepts are achieved by the learner's own efforts (15:347).

Teacher curriculum planning

In the past it has been a generally accepted viewpoint or assumption that most public school teachers would be provided the necessary curriculum guides and, in some instances, courses of study. This practice has perpetuated the use of outdated materials and content. Unless the teachers who are being prepared can be given a grasp of the techniques and concepts which are necessary in order to select content and develop curriculum materials oriented to current philosophy and conditions, they will be unable to keep pace with their field.

The recent bulletin by the Association of Supervision and Curriculum Development makes the point: "More than in the past curriculum development and teacher preparation are seen as inseparable" (23:63).

The importance of and necessity for regular curriculum work by the teacher is emphasized in most of the references on curriculum planning (43) (51) (47). A particular instance of this regarding the pre-service preparation of industrial arts teachers is emphasized in the 11th and 12th yearbooks of the American Council of Industrial Arts Teacher Education (1:171) (2:117).

Attention to curriculum development with teachers in service and in the pre-service preparation of teachers is to a large extent universal in all areas. In industrial arts, this is certainly true. Progress in this area is recognized as a developmental task by Woodruff (6) which extends beyond the limits of professional education utilizing interdisciplinary teams to get at the warp and woof of each subject field to get it ready for conceptual learning. He states:

> Among the skills required are value analysis, translation of value analysis into behavioral objectives .... concept analysis of subject matter, translation of selected concepts into teaching materials and plans, and the aligning of goals, content, process and evaluation into a continuous educational path (6:111).

The third phase of the Field Study program which is devoted to curriculum development of resource units derived from observation and study in industry takes account of the recommendations mentioned in the research literature.

Summary

This chapter has summarized the related research in the field of industrial arts education, and teacher preparation in particular, to identify and examine the most current, advanced educational thinking. This review has attempted to highlight the philosophical and taxanomic analysis of the subject matter field which lend support to the need for a critical examination and effort on the part of industrial arts teacher educators to develop innovative and practical new curricular programs for the preparation of industrial arts majors.

A second and equally important examination has been made of the literature and pertinent research related to the general field of concept development as it applies to the psychology of learning. This aspect of this research project is most fundamental to the reason for establishing this type of program. If attention is directed to only the operational mechanics of any Field Study experience, without a fundamental grasp of why it is being conducted and an awareness of the importance of the process of concept development is not recognized, the ultimate results or benefit from the program to the students and staff will be seriously diminished.

CHAPTER II

METHOD

The procedures used for developing the Directed Field Study followed generally the suggested pattern and procedures recommended in Festinger and Katz (2:Ch. 2-3) for establishing field programs of this type. This project represents a concerted effort to create a new curricular model for an undergraduate college program. Much of the information and materials produced are the result of developmental procedures subjected to ongoing review and evaluation based on empirical observation and evidence gathered during this pilot operation of the Field Study Program.

Since a number of different procedures were necessary for developing specific parts of the project in order to accomplish the stated purpose and objectives of the research project, these will be described and treated separately in the following sections.

Development of the Program

1. A research committee was formed to prepare a proposed program to meet the need for a new kind of experience for undergraduate industrial arts majors to provide them with a more concrete and up-to-date exposure to modern industrial technology. This committee was composed of industrial arts division staff members, interested industrial management personnel and college personnel from other disciplines.

2. Selected literature was reviewed from the areas of industrial management, industrial psychology, economics and industrial sociology, together with such research studies in the field of industrial arts as have been mentioned in the review of research to identify key elements of industry to be included for

study (84), (81), (88), (89), (85).

3. A proposed nine-week field study program consisting of three major phases was structured in a form to accommodate the study of various types of representative industries and provide opportunity for an in-depth study of the major common elements of industry, as identified through research and consultation with industrial management personnel and others.

4. A group of approximately 20 middle and top management and labor representatives were contacted through the Syracuse Manufacturer's Association to review and make recommended adjustments in the proposed plan of the program.

5. The adjusted program was then submitted to the college administration for approval as a professional laboratory field experience to be administered within the student teaching semester in lieu of one nine week quarter of regular student teaching for those students selected for assignment.

6. Industries which were considered to be suitable for participation in the program by reason of their size and their type of product or service were then contacted and invited to participate in the program on a trial basis.

7. An orientation conference was held with representatives of the various companies indicating their willingness to participate in the program, to fully explain to them the purposes and objectives of the program and answer questions. A schedule of the planned program and a copy of the preliminary draft of the student workbook was distributed to each company at that time.

Selection and assignment of students

1. Students scheduled for their off-campus student teaching semester were given an explanation of the program and its requirements and asked to submit applications for assignment if they were interested.

2. Applications of those students who applied for assignment were reviewed and those considered most qualified were notified of tentative assignment subject to the satisfactory completion of their first nine weeks of student

teaching in a public school.

Development of Field Study Materials

A number of materials had to be developed for the use of students, staff and industrial personnel in the administration of the program in order to clarify procedures to be followed and responsibilities to be assumed by all concerned.

Student Workbook

In implementing a "directed" field experience the provision of appropriate guides for the use of the student in this type of experience became essential. The following procedure was used in developing the student workbook for the program:

1. From the structure of the overall program and the elements of industry selected for study, a plan for a student workbook was prepared to cover the introductory orientation phase, and the directed observation in industry phases of the program.

2. From a review of the literature from selected sources; and consultations with industrial personnel, college staff in other disciplines and other industrial arts staff, the content for the major sections of the workbook were developed for use covering each of the major elements of industry to be studied.

3. Following tryout use of the workbook, each section was evaluated and revised on the basis of feedback from students using the book, review by industrial personnel and management people, and observation and evaluation by the project staff.

4. After the first year's use of the workbook, revisions of the content and questions for each section were prepared and mailed to selected personnel for review by people who were considered specialists in their field.

5. Conferences were scheduled on each section of the workbook with a

committee of specialists to whom sections of the workbook had been mailed in advance for review. Differences of opinion were resolved pertaining to wording of questions, terminology and placement of questions within the various sections.

6. The final revised workbook was produced by the project staff from conferences with specialists, from student reactions and suggestions, and from a review by the project advisory committee.

Seminar Resource Units

1. From the plan of the total program as developed covering the basic elements of industry, a series of topics to be covered in seminar was determined for which resource units would be developed.

2. A careful review of selected current literature including pamphlets, texts, and other appropriate resource materials was made by the project staff for information to be included in the twenty-one seminar resource units identified for use in conducting the program seminars.

3. A format for each unit was developed to consist of: a documented content outline; a resource bibliography; supporting quotations to supplement points of the outline; a suggested set of appropriate instructional transparencies for overhead projection; and a list of examples of supplemental materials. All items were coded to permit keying them to appropriate topics in the outline.

4. Each seminar resource unit developed was prepared as a result of the combined effort of several parties including: the project staff; industrial resource personnel; student participants; project advisory council members; and faculty from other disciplines of the college.

5. All units were reviewed regularly after use and alterations, additions and deletions were made during the entire project. Student participant reactions were obtained through the use of written evaluations completed at the end of each operational phase. These were noted and considered in the final revisions

which were completed immediately following the final quarter of operation.

Guide to Industrial Personnel

During the early stages of this project the staff met with key industrial personnel in many companies to acquaint them generally with the program and to determine their interest in cooperating with the field study program. At each of these meetings many common questions were raised by the industrial representatives. The need for a guide to industrial personnel was recognized by the project staff to answer the following questions frequently asked by personnel within the industrial plants and companies where students were to be assigned:

a. Why is such a program necessary?
b. What are the program purposes and objectives?
c. What kind of students will participate and what is their background?
d. What is Industrial Arts?
e. How is the program organized?
f. What are the responsibilities of industry to this program?

1. A preliminary draft copy of a guide for the industrial personnel was prepared to answer the stated questions based on conferences, comments and individual interviews with personnel in many phases of the industry and the suggestions of the students in the program.

2. The pilot draft of the guide was distributed to selected coordinating and management personnel within the participating industries for review and comment.

3. From the comments and suggestions received orally and in writing and from the suggestions made by the project advisory committee, a guide for industrial personnel was produced for general distribution and use.

Test - Understanding Concepts of Industry

The need for a pre-post test instrument for use with students in the program was first met by using Blomgren's (81) "Understanding American Industry" test which was developed as a result of his research study. The results obtained from this test did not provide valid evidence of progress made by students in the field study. It became apparent that a test designed specifically for the field study was needed. A test was constructed to meet the needs of this type of program using the following procedure.

1. Instructions on construction of objective test items were given the students prior to their first week of observation in industry. Since one of the major responsibilities of the students was to identify and record the major concepts concerning the area of industry under study for the week, students were requested to formulate questions based on concepts identified which were considered to be of major importance.

2. Test items were requested from the students during each of the six weeks in which the students were assigned to the industries. Each student turned in three questions each week on separate 5x8 cards which were especially prepared for this purpose. All items were of the best-answer multiple-choice type. See Appendix H - 1.

3. Items from the questions received each week were screened by the staff to eliminate irrelevant and poorly constructed questions and placed in a cumulative file, or item pool.

4. All items in the cumulative file (over 300 items) were finally reviewed to construct a 100 item test placing equal weight on each of the six major elements of industry studied.

5. From trial administration of the test, an item analysis was made to eliminate poor questions and a final draft of the test produced for administering.

Industrial Concept Identification and Tabulation (Procedure Identification)

1. During the first week of each operational period of the program, the participating students were provided with background knowledge relating to concept identification, the importance of concepts in the educational process, and

the structuring of concept statements for inclusion in their weekly report. To assist the students, examples of well constructed industrial conceptual statements were provided for their guidance (101:7).

2. Each student was asked to synthesize and generalize, in written form in his workbook, those concepts he identified during each week of study and to group his statements into natural and appropriate categories that he recognized as sub-elements of the topic under study (2:Ch. 10).

3. The final seminar session each week was devoted to open discussion between staff and student participants to promote the process of concept identification related to the weekly topic under study. At this session the students also discussed the sub-elements and groupings under which they could provide supporting definitive conceptual statements.

4. Each student's compilation of conceptual statements was submitted for review and tabulation at the end of each week. These statements were recorded into a log by categories and sub-elements of each category at this time. Conceptual statements which were identical or in essence contained the same meaning were tabulated to show frequency of identification.

5. The tabulation of concept statements was made in such a way that statements received from each of the four student groups were recorded in a separate column under separate categories thereby permitting cumulative tabulation of new statements and a frequency count entry after previously recorded statements. Statements from each succeeding group of students were separated in the tabulation by a line drawn after the last statement recorded for the previous student group. The cumulative tabulations will be found in Appendix G.

CHAPTER III

RESULTS

The experience gained from the experimental tryout procedures and materials used during the past two years in establishing and operating the Directed Field Study Program with cooperating industries has been most valuable, This period has enabled the project staff, through constant consultation and evaluation with others, to develop several guidelines and practical operative curriculum materials which can be used by teacher education institutions and others who may wish to replicate this or a similar program.

The procedures outlined in Chapter II were followed in developing this program and the accompanying materials, taken collectively, serve to satisfy the primary objective of this project to develop a guide for the program which others might profitably use. The general organization of the program and a guide for its operation are covered in this chapter.

Structure and Plan of the Program

The research committee and staff originally designated to develop a proposed program spent considerable time discussing the nature of the program needed and the general structure around which it should be organized. It was agreed very early that the program should be designed to provide undergraduate students with a maximum amount of time and with the opportunity to observe and study industry at first hand.

It was also decided that there should be a reasonable amount of direction given to what the students should study, observe and record for their benefit as future teachers. To provide this direction it was recognized that provision should be made for the following:

1. An orientation period to acquaint students with certain background information essential to their observation in industry.
2. A series of seminar meetings on selected topics to be related directly to the phase of industry being observed each week.
3. A student workbook to guide the students in identifying some of the most important aspects of the industry to which they would be assigned.
4. Provision for the students to analyze and extract the most pertinent information for the development of useful curriculum materials based on identified key concepts about industry.

Elements of Industry

The project staff members and selected resource people, with the Advisory Committee, reviewed a number of basic texts and research studies identified in Chapter I in order to structure a program which could be accommodated within the present undergraduate college curriculum. The plan also had to provide for the proper distribution of time and emphasis to those major elements of industry which authorities in the field considered common to most industries.

Well-known, recommended texts, such as those reviewed in Blomgren's study (81); the studies by Larsen (84) and Olson (85) and the Common Body of Knowledge (4) study for management consultants were used as prime sources to provide basic guidelines. Other useful sources such as the following were examined:

Management in Industry by Claude S. George (Prentice-Hall, 1962)

Industrial Organization and Management by Lawrence L. Bethel (McGraw-Hill, 1966)

Manufacturing Organization and Management by Amrine et al (Prentice-Hall, 1966)

Manufacturing Management by F. G. Moore (Irwin, 1961)

Management of Industrial Enterprises by R. Owens (Irwin, 1965)

The final plan for the distribution of the students' work in the program was established around three major phases covering a regular 9 week quarter as follows:

Phase I - Orientation and background information (one week)

Phase II - Observation and study in industry (six weeks)

Phase III - Curriculum construction workshop (two weeks)

The general sequence and amount of time devoted to each of the various phases is shown in Figure I.

FIELD STUDY SCHEDULE

Week 1	Phase I - Introductory & Background Seminars (On Campus)	
	1. Industrial Psychology 2. Industrial Sociology 3. Industrial Economics	4. History of Ind. & Labor 5. Organization of Industry 6. Guide to Observation
	Phase II - Observation and Study in Industry	
Week 2	Industrial Relations	
Week 3	Engineering	
Week 4	Production	
Week 5	Labor --- Part I - In Industry Part II - Special Seminar	
Week 6	Financial Control	
Week 7	Marketing	
	Phase III - Culminating Seminars (On Campus)	
Week 8	Refinement of concepts and development of resource materials	
Week 9	Presentation and discussion of selected resource materials	

Figure I

Using the general overall time available for Phase II of the program required the careful examination of the elements of industry to be used for in-depth study of the industries. The elements selected are as follows:

1. Industrial Relations
2. Engineering
3. Production
4. Labor
5. Financial Control
6. Marketing

This division of elements was strongly supported by the research and resource people consulted. The general pattern of organization for use in the program with the major elements and sub-functions of industry to be studied are shown in Figure II on the following page.

With the general structure and time distribution shown in Figures I and II, it then became necessary to experimentally develop an operational guide to procedures for operating and administering the program. This guide to the program has been developed and is included in the next section.

Guide to the Program

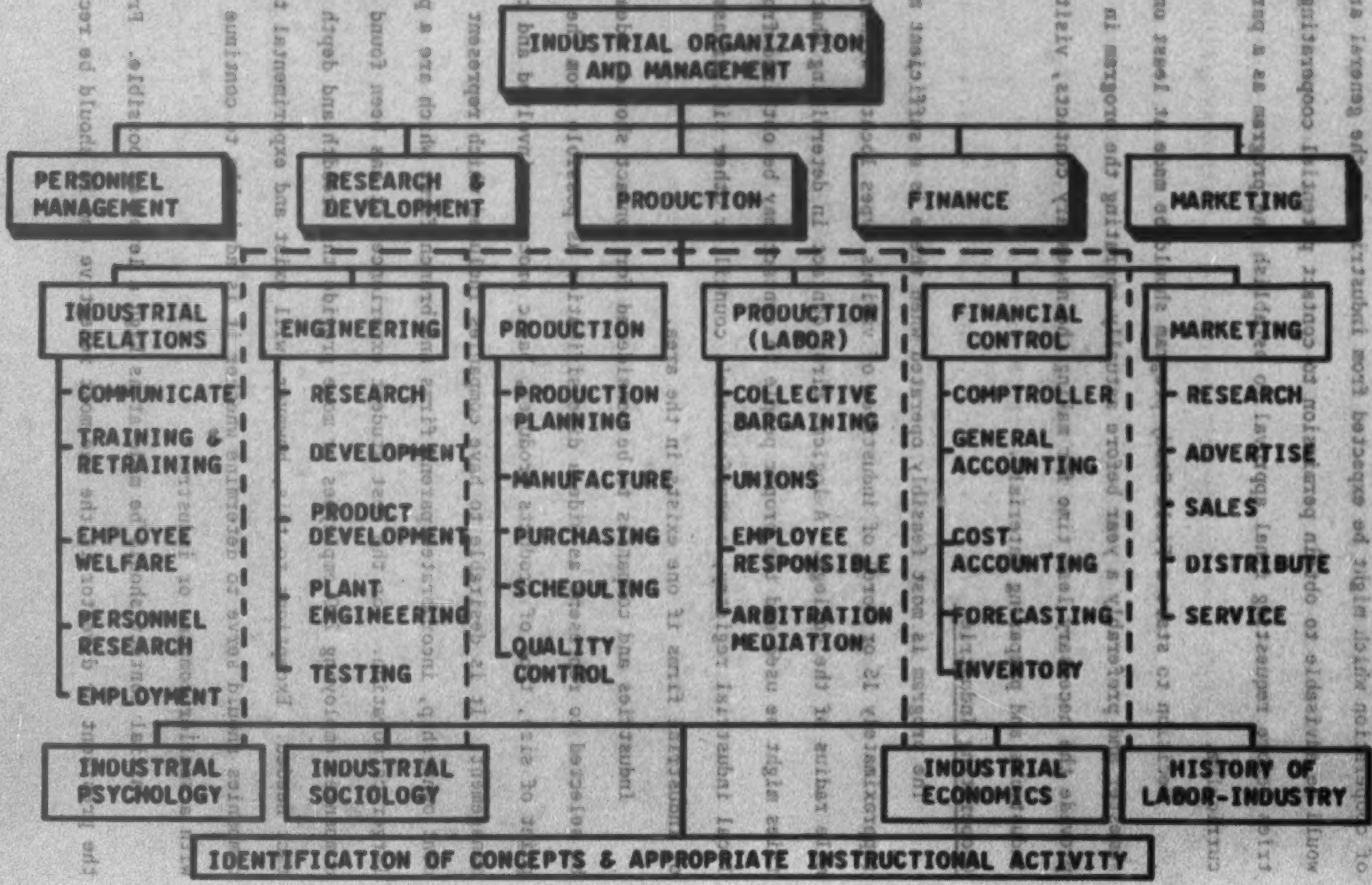
The information and general guidelines contained in this section have been developed from the two-year experience of operating the program under a research grant and one previous year of operation as a pilot project to determine its feasibility. Institutions and individuals wishing to establish a similar program will want to make the necessary adjustments to fit their own particular circumstances.

Administrative Approval

Once the industrial arts division or staff decides that they wish to inaugurate a Field Study program, it would be advisable to discuss in broad outline, with the college administrative officers, the nature of this program and the place it would take in the college curriculum for industrial arts majors. A review of the materials developed as a part of this report, particularly the Overview and Explanation of the Program (Appendix A-1) and the Student Workbook (Appendix B), would be most useful at this point.

FIGURE II

COMMON ELEMENTS OF INDUSTRY


INDUSTRIAL ORGANIZATION AND MANAGEMENT
PERSONNEL MANAGEMENT
RESEARCH & DEVELOPMENT
PRODUCTION
FINANCE
MARKETING
INDUSTRIAL RELATIONS
COMMUNICATE
TRAINING & RETRAINING
EMPLOYEE WELFARE
PERSONNEL RESEARCH
EMPLOYMENT
ENGINEERING
RESEARCH
DEVELOPMENT
PRODUCT DEVELOPMENT
PLANT ENGINEERING
TESTING
PRODUCTION
PRODUCTION PLANNING
MANUFACTURE
PURCHASING
SCHEDULING
QUALITY CONTROL
PRODUCTION (LABOR)
COLLECTIVE BARGAINING
UNIONS
EMPLOYEE RESPONSIBLE
ARBITRATION MEDIATION
FINANCIAL CONTROL
COMPTROLLER
GENERAL ACCOUNTING
COST ACCOUNTING
FORECASTING
INVENTORY
MARKETING
RESEARCH
ADVERTISE
SALES
DISTRIBUTE
SERVICE
INDUSTRIAL PSYCHOLOGY
INDUSTRIAL SOCIOLOGY
INDUSTRIAL ECONOMICS
HISTORY OF LABOR-INDUSTRY
IDENTIFICATION OF CONCEPTS & APPROPRIATE INSTRUCTIONAL ACTIVITY

Administrative approval to proceed would naturally depend upon the extent of cooperation which might be expected from industries in the general area. It would be advisable to obtain permission to contact potential cooperating industries before requesting final approval to establish the program as a part of the curriculum.

Decision to start a Field Study program should be made at least one full semester and preferably a year before actually operating the program in order to provide the necessary lead time for making the necessary contacts, visiting industries and preparing materials.

Cooperating Industries

The program is most feasibly operated when there is a sufficient number (approximately 15 or more) of industries of various types located within a 50 mile radius of the college. A logical first contact in determining what industries might be used and the proper people to contact may be obtained from a local industrial registry, a manufacturer's council or other similar association of industrial firms if one exists in the area.

Industries and companies to be considered for contact should, ideally, be selected to represent as wide a diversification as possible from the standpoint of size, type of products produced, basic processes involved and type of management. It is desirable to have companies included which represent independent ownership, incorporated parent firms and branch firms which are a part of a larger corporation. For the best student experience, it has been found that companies employing 250 employees or more provide the breadth and depth of contact needed. Exceptions to this, however, will exist and experimental trial of companies should serve to determine whether it is advisable to continue working with a smaller company or industry.

Initial contact should be made at as high a level as possible. Frequently the president or director is the one most receptive and it should be recognized that his final approval will have to be obtained, eventually, in any case. A contact or coordinating person should be designated in each company to provide liaison and coordination between the college and industry. This person is frequently the director of training or an industrial or employee-relations person.

It has been found that arrangements for an appointment by phone followed by a personal interview is most effective in establishing contact with the industries. Samples of the program materials previously mentioned should be shown to give indication that there is good organization behind the proposed program.

During the first visit to an industry and following the interview with company officials it is advisable for the Field Study coordinator to schedule enough time to take a full tour of the industry to obtain a general knowledge of the nature of the products, processes and materials used and the general organization of the company.

Data on the company should be recorded for future use in corresponding with the company and in discussing its operation with the students. A form similar to that in Appendix A-2 will be found useful for this purpose.

Orientation of Industrial Coordinating Personnel

Once agreement has been obtained from a sufficient number of industries to operate the program, an orientation meeting of the coordinating personnel from each industry should be scheduled at a central location.

This meeting should be scheduled approximately two months in advance of the time when students are to be assigned to the cooperating industries. This lead time is very important for good working relations and planning with the industries concerned.

The purpose of this meeting is to provide a more comprehensive explanation of the program and to give opportunity to answer any questions which may arise concerning general operation, time schedule, general assignment of students within the plants or company, and general responsibilities to be assumed by the college and the industries and their representatives.

The Overview Statement (Appendix A-1), The Guide to Industrial Personnel (Appendix F), and copies of the Student Workbook (Appendix E) should be distributed and fully explained at this time.

Particular point should be made of the fact that two student workbooks will be provided to the industrial coordinator for purposes of making known the types of questions and information which the students will be seeking. The industry coordinators should be advised that one copy of the workbook should be kept intact for reference and the second copy broken down into its various sections and distributed to key personnel in each of the major elements of the industry. These personnel also need to have a general idea of the type of information the students will be looking for as they come into their department.

A definite commitment from each company regarding the number of students they will be willing to accept during the year and an indication of which period during that time of year when the program will be in operation that the company would prefer to participate can be obtained at this time. These and other items of information should be obtained from each company (Appendix A-3, A-4) for use by the Field Study coordinator in planning.

Cooperating industries should also be requested to supply background information to be compiled in a folder which the student may review during the first week on-campus seminar, before being assigned, to generally acquaint him with the company. A request for this information can be distributed to each industry (Appendix A-4) as soon as they indicate a willingness to participate in the program.

Text and Resource Materials

Selection of an appropriate text to provide comprehensive background information should be made as early as possible and before the student workbook is reproduced since appropriate reference and reading assignments will need to be incorporated. Several texts can be considered from those mentioned earlier, in addition to the text used in conjunction with the workbook included in Appendix E.

Sufficient quantities of the materials to be included in the Student Resource File (Appendix D) should be ordered so that a complete packet can be placed in the hands of the student. These packets of materials should be returned at the end of the field study for re-issue during the next period of operation of the program.

If possible, every effort should be made to obtain a complete set of the references included in the annotated bibliography (Appendix D) for exclusive use by the Field Study students and coordinator.

Student Workbook

The student workbook should be reproduced, preferably by multilith, in loose-leaf form and made available to the students through the college bookstore at cost. The workbook may be printed on both sides of the page on good quality paper, reducing the bulk at no inconvenience to the student. Most students also prefer to have the material drilled for insertion in a standard three-ring binder.

Enough copies of the workbook should be reproduced for the first year's operation. The number of copies will depend on the number of students to be assigned and the number of companies who will be participating in the program over the year. Additional copies will also be needed for other interested persons. Two copies should be provided each company and each student should also have two copies. Local policy and practice will determine how the cost of these should be borne.

Facilities

Special mention must be made of the type of facilities which would be most effective in operating this type of program.

The introductory seminars during the first week of the program should be held on the campus with provisions for guest speaker and staff presentations. This will also insure the use of the library facility of the college by the students for assignments during this phase of the operation.

During the six-week period when the students are assigned to the industries, introductory seminars may be conducted in an industrial plant at the beginning of each week. Most plants have classroom facilities which are suitable and should be utilized for this purpose. This also has the advantage of keeping the group at one location for the entire day. An introductory guest speaker and seminar in the morning followed by a conducted plant tour in the afternoon utilizes the time to full advantage.

The Friday seminar which is conducted each week during the six-week period of assignment to the industry should be held at a centrally located facility. Since the nature of this seminar deals with interaction between the students and coordinator, it is more desirable to have a central location for these seminars away from industry. Such facilities will be used for the entire day and can be arranged for from several sources. Public schools, Chamber of Commerce, Government buildings and Manufacturing Associations are a few of the types of organizations which may be able to provide the appropriate facilities for these Friday seminars.

The last two weeks of the program which is conducted on campus, involves the development by the students of curriculum resource materials. This work should be conducted in facilities designed for this purpose since what is accomplished represents a major outcome of the program.

Ideally, a curriculum laboratory would be the best facility for the purpose of developing curriculum materials. Provisions for flexibility in table and seating arrangement should be available both for committees and for small group work and presentations. Duplicating equipment such as spirit duplicators, paper punches, drills, and collating equipment should also be available for the final reproduction of the materials developed. Typewriters should be made available, or students should be encouraged to use their own, so that all material which is produced is in good legible form. A collection of resource books, periodicals, pamphlets and other reference materials should be made accessible for ready reference in these facilities.

It is most desirable that all the equipment and materials previously mentioned be located either in a curriculum laboratory designed for this purpose or in a series of interconnecting rooms which can be used for curriculum construction work. The availability of the facilities and equipment in a specific area will be helpful in keeping the students at their tasks, eliminating the need for moving about the campus in search of materials or duplicating equipment and other resources. This arrangement also provides the means for more effective committee work and consultation at all times with the Field Study coordinator to insure uniform reproduction of the final resource materials.

Administrative Procedures

The suggestions and guidelines set forth here are supplied for guidance in administering a program of this type at other institutions.

Field Study Coordinator

It is essential that a person be designated for this responsibility approximately one year in advance of operating the program. This person, preferably, should have had some industrial experience. He should also have considerable ability in conducting seminar-type discussion meetings and have the general ability to meet and confer with middle and top management industrial and business personnel.

Previous and/or concurrent experience in teaching a methods course and the supervision of student teachers provides the necessary background for working with the Field Study students in curriculum development work. This requires insight regarding the evaluation of suggested teaching activities and approaches which will be discussed in the seminars.

The Field Study Coordinator should be given a half time load for one full semester prior to operating the program in order to make the necessary industrial visitations and contacts and to supervise the preparation of curriculum materials to be used.

During the operation of the Field Study Program the Field Study Coordinator should have no teaching responsibilities other than conducting the Field Study seminars on Monday and Friday and making visits to the students in the industries on each Wednesday during the six-week period the students are assigned to the industries.

Time Allocation

The Field Study program as operated covers a nine-week period. This fits in well with the normal semester and quarter courses if they are used in the program. This period of time provides a good balance for all three phases of the program and allows sufficient time for students to assimilate the information covered and develop concepts about industry - which is the most essential factor in the picture.

Budget

When the program is conducted during the student teaching semester it has been found that the cost of supervising the students in the Field Study is about the same as the cost of supervising a like number of student teachers. This is based on the cost of supervising the student teacher off campus twice in a nine-week quarter. This is true provided the industries used in the program are within a 45-50 mile radius of the college and do not require the coordinator to travel too great a distance on Mondays and Fridays to conduct the seminars and make visits to the industries.

The following figures are for one nine-week period of operation of the program:

Coordinator salary	Assoc. Prof. (full time)
Reference - Resource materials	$400 - 450 (initial expense)
Travel	$150
Telephone and postage	$ 50
Reproduction supplies (ditto)	$ 45
Film rental (20 x $5.00)	$100
Transparencies	$ 20
	$365

Excluding the salary and initial expense of texts and resource materials, the cost per period of operation would be $365 or twenty-four dollars per student based on 15 students assigned.

Provision should be made for additional secretarial help to the coordinator for one semester to initiate the program. After that secretarial service would be required.

Orientation and Assignment of Students

If all students are to be assigned to the Field Study at some specified period it would be advisable to provide the students with a general explanation of the program in the semester prior to their assignment. When the program is to be operated for students who elect this experience in lieu of the second quarter of student teaching, an orientation to the program is essential. The orientation should be scheduled in the semester just prior to assignment to student teaching.

Students who express an interest and desire should complete an application form (Appendix A-5) which may be reviewed to select those students who are best qualified.

Assignment of students can be based on criteria determined by the college. When the program is operated during the student teaching semester, the following factors were considered: (1) performance in the first student teaching quarter, (2) academic record, (3) previous industrial experience, (4) general interest and commitment to teaching industrial arts.

An optimum number of students to be assigned is 15-18 students. This size group is best suited for seminars and can also be accommodated well in industrial plants and on tours.

When final selection of students to be assigned to the cooperating industries has been made, assignment letters are sent to the student (Appendix A-6). A similar letter, together with a calendar of dates is sent to each industry (Appendix A-7, A-8) to eliminate any confusion concerning subjects to be covered in specific weeks of the program and to assist the industrial coordinator in preparing a schedule for the student to follow within each industry, as suggested in the Guide to Industrial Personnel (Appendix F).

Student Academic Credit

Local policy and regulations on each college campus will have to determine this. In the operation of the program under this project, the nine-week assignment to the Field Study has been equated with one nine-week assignment in student teaching or 7 1/2 semester hours where the student receives 15 semester hours credit for one full semester of student teaching.

Student Evaluation

Performance in the Field Study cannot be evaluated in the same way or on the same basis as student teaching. The Field Study Coordinator can evaluate the students in the following three areas: (1) their participation and contribution in seminar, (2) their information and notes in the workbook, (3) their work on the curriculum resource units. In all of these, considerable emphasis and premium should be placed on freedom of thought, new ideas and insights expressed, and ability to discern and evaluate the particular factors and elements in their industry. The coordinator should keep a record of student reports and materials submitted. A form such as shown in Appendix A-9 will be useful for this purpose.

The Coordinator's evaluation can best be expressed in anecdotal form or as an "S" (satisfactory) or a "U" (unsatisfactory) grade.

The industrial coordinator should submit an evaluation of the student based on those characteristics and factors which the coordinator is in a position to observe and evaluate. This evaluation may be requested with a letter and form as shown in Appendix A-10, A-11.

Student Evaluation of the Program

Adequate provision should be made for the students assigned to the Field Study program to furnish their evaluation of the program together with suggestions for improving or revising the program to the Field Study Coordinator. This is best accomplished by encouraging the students to take notes during their time in the program and then submit these on a form on which they can record their reactions during the last week. These can be reviewed by the Coordinator and discussed during one of the final sessions.

Experience has shown that many worthwhile suggestions will be received if they are requested and acted upon.

Industries cooperating in the program also are usually interested in student reaction to the experience gained in their plant. By providing a form for the student to turn in to the company, this information can be made available to each company which requests it. A form similar to that shown in Appendix A-13 has been most effective.

Recognition for Cooperating Industries

The Field Study program can not be successful without the continual interest, encouragement and cooperation of many industries and countless hours of direct assistance from the many industrial coordinators, speakers and resource personnel. The institution will very likely be unable to compensate or remunerate these companies and individuals for their valuable contributions to this program.

The institution may, however, provide a certificate of recognition and appreciation to those industries that have continually cooperated with this project. An example of an appropriate certificate is illustrated in Appendix A-12.

Program Planning and Operation

The degree of success in a program of this type is in direct proportion to the care and attention given to a number of separate but related aspects of the program. These will be explained in this section.

Program Schedule

An essential element in the successful operation of a program of this type is a detailed and well-coordinated schedule for the entire period, worked out well in advance and showing all essential details such as times, meeting places, topics, films and guest speakers.

Approximately two weeks of time by the program coordinator should be devoted to arranging the class schedule prior to each operation of the program. This planning should begin at least two months prior to the operation of the program. After ordering the films, which must be done early, a preliminary and tentative daily and weekly outline is worked out showing the sequence of events such as titles of presentations by college staff and resource speakers, films, plant tours, meeting places and times. This tentative outline can be modified and adjusted to accommodate the scheduling of outside speakers, films, meeting times, etc.

The ordering of films for the program must be done three to four months before the beginning of each operation of the program in order to insure a reasonable opportunity to secure the necessary titles. As the confirmations for the films are received, the titles can be noted as finalized on the tentative schedule.

The securing of places to hold seminars, such as at various industrial plants, should be accomplished next in the planning stage. It is usually quicker to contact the person in charge of the plant by telephone to explain the requirements of hosting the group for the day. Questions regarding the plant tour, lunch, and speakers can be answered at this time. After securing a commitment by telephone, a follow-up form letter can be used to confirm meeting arrangements made with each plant. A post card reminder should be sent to each plant one week in advance of the meeting to insure that the commitment is still valid.

After finalizing the meeting places and plant tours, the securing of guest speakers is now undertaken. A personal telephone call to the man in question is usually necessary, especially if the speaker has not been used in the program before. After explaining the requirements for the presentation, a commitment is secured over the telephone. A letter confirming the speaking engagement with a suggested outline of points to be covered and a request for background information to be used in introducing the speaker should then be sent. (Appendix A-14, A-15). Examples of the type of general outline to be supplied the guest speaker will be found in Appendix C-1. A post card reminder of the speaker engagement, title of presentation, time, and meeting place is sent to each guest speaker about one week prior to the scheduled time he is to speak.

The finalized copy of the schedule should be reproduced approximately two weeks before each operation of the program begins. Copies of this schedule are given, along with explanations, to the students during the first meeting of the class. Additional copies of the schedule should be given to all staff and industrial personnel who are either involved in the program operation or should be aware of the schedule. An example of a completed program schedule is included in Appendix B.

Coordinator Visitations to Students in Industry

The Coordinator should schedule a visit to each student in the industry to which assigned at least once during each operation of the program. These visits can usually be made on Wednesday of each week. Where the industries are close enough, at least two and in some cases three industries can be visited in one day. These visits serve to enable the coordinator to become more familiar with each industry and the personnel.

During the visit, the coordinator can talk with the industrial coordinator to answer questions and gain a better grasp of the operation of the companies participating in the program. Some time can also profitably be spent having the student show the coordinator around the plant, pointing out some of the unique features. In order that the industrial coordinator will have time available during this visit, it is advisable to send a post card notification similar to that shown in Appendix A-16.

These visits are most valuable during the first year of operation of the program.

Seminar Resource Units

One of the most important and critical aspects of the Field Study is the seminars which are conducted during Phase I of the program on campus and during Phase II on Mondays and Fridays of each week while the students are doing their observation and study in industry.

One of the major objectives of this program was to survey the literature of the field of industrial management and through use of informed resource personnel and consultants develop a concise content guide and outline for each of the seminars which were to be held in the three operational phases of the program.

These resource units were developed over the period of operation of the research project to serve as a guide to college personnel wishing to conduct a program of this type.

Each seminar resource unit consists of the following:

1. A documented content outline.

2. A selected set of references.

3. Supporting quotations.

4. Charts and other materials to be used as overhead projectuals for presentation.

5. List of examples of materials to supplement.

Following the procedures described in Chapter Two, twenty-one seminar resource units were finally selected for development to carry out the intended purposes of the Field Study program of: (1) orienting students to industry, (2) identifying key concepts about industry and, (3) developing appropriate curriculum resource units for use in developing concepts about industry.

The completed Field Study Seminar Units which comprise the core of the instructional content of the program are located in Appendix C of this report on the following major topics:

1. Orientation to Field Study
2. Industrial Arts and the Directed Field Study
3. Industrial Psychology
4. Industrial Sociology
5. Industrial Economics
6. Forms of Business Ownership
7. Current Issues Facing American Industry
8. History of American Industry
9. History of American Labor
10. Organization and Structure of American Industry
11. Concepts - Basis for Curriculum Development
12. Industrial Relations
13. Engineering
14. Production
15. Labor
16. Finance
17. Marketing
18. Curriculum Construction Part I
19. Curriculum Construction Part II
20. Review and Evaluation of Resource Units
21. Student Evaluation of Field Study Program

In addition to the complete seminar units, a number of speaker outlines have been developed for use in suggesting content and scope of material to be covered by resource speakers on several topics. These topics may be used to orient the Field Study students to a particular week's study and observation in a particular phase of industry. These suggested resource speaker outlines will be found also in Appendix C.

Curriculum Resource Units

One major outcome for the student taking the Industrial Field Study program is the development of resource units which he can subsequently use in the teaching of industrial arts at the public school level. In order to provide guidance to the college students at the time when they are developing curriculum resource units, a guide was prepared to answer questions frequently asked by the students. This guide, along with the availability of the coordinator to answer special questions, served to insure the production of well thought-out and valuable resource units during the final phase of the program.

During the initial introduction to the development of resource units, at the beginning of the last two weeks of the program, staff presentations on curriculum development are given. (See Seminar Unit outlines in Appendix C). These presentations serve to develop in the students a general idea of what kind of units they will be expected to produce. After these presentations, the students are arranged in committees in order to decide, under staff supervision, on the subject area and units to be produced.

The committees proceed to develop curriculum resource units according to the guide format utilizing the workbook material they have compiled during their association with industry. They also use other sources such as the Field Study resource materials, staff, books, and library facilities.

The completed work of each committee is reproduced and copies are given to the rest of the class. At the time the copies are distributed, each committee makes an oral presentation of its work and answers questions from the staff and the rest of the class. These presentations usually take from 30 to 45 minutes each.

The resource units of the committees together with each student's workbook and accumulated resource material become the property of the student and can be used by him in constructing and enriching his course offerings after he begins teaching.

The following pages represent the guide furnished to the students for developing curriculum resource units. Selected representative examples of completed resource units done by students who have completed the Field Study program are included in Appendix I of the report.

DIRECTIONS FOR PREPARATION AND PRESENTATION OF CURRICULUM RESOURCE UNITS

INTRODUCTION

A brief outline, consisting of two pages, should be arranged so that, when open, the four columns are visible (see attached example). The four columns are titled, left to right: sub-concepts, lesson topics, activities, and references. It would be advisable to work using four blank sheets spread out before you and develop all four areas as your ideas and train of thought dictate. There should be some horizontal correlation; however, in most cases, it would not be a one-to-one type of relationship. The example given should be helpful in showing you the general idea of how this outline should be developed. This outline will provide the reader with a brief description of the contents of a sample unit.

I EXPANSION OF SUB-CONCEPTS

Each sub-concept in the brief outline should be taken individually and expanded so that the reader may understand the scope of the sub-concept. You may use outline form or paragraph form. Include facts which will support the sub-concept and give it more definite boundaries.

EXAMPLE:

A. *Individuals who apply for specific jobs should be aware of the education and skill requirements before applying. (Sub-concept taken from the outline.)*

1. *The applicant should have some idea of what kind or type of work he is qualified for and apply for work only within his ability, skills, and education range.*

2. *The applicant with previous successful experience in the type of job he is applying for will more likely be a successful applicant than the person without this experience.*

3. *The potential applicant should review the job description to be certain that he can successfully function in that position before he completes a formal application.*

4. *Generally, only those who have the exact qualifications will be hired.*

II LESSON TOPICS

The lesson topics should contain the body of information, as complete as possible, which can, or should be, taught to a class of high ability high school students. The reason for this is that it would be easy to pick and choose from a complete package of information to adapt to various classes, and rather difficult to add to the information if it were incomplete, for a high level class. Assume you have a class of high ability high school students and write the topics for them.

The major headings of the lesson topics should be selected while making the brief outline. You should divide the total information of the unit into logical groupings of information which can be handled more easily as lesson topics. You will probably end up with 3 or 4 lesson topics, although this number is by no means a maximum limit.

Each lesson topic should contain the following headings with appropriate information included:

A. **TITLE**

1. **CONCEPTS:**

From your brief outline, select those concepts which can best be developed by means of the material to be covered in the unit. The concepts to be developed should be stated in a general inclusive statement.

2. **INTRODUCTION:**

This should take the form of a short paragraph indicating where or when this unit might be most appropriately taught in the teaching-motivation sequence. Where possible, a general statement suggesting how the topic may be introduced should also be included.

3. **PRESENTATION:**

Under this heading, include the major points and facts in a logical order which should be included in this lesson topic. Generally an outline form is easiest to use in this work; although, if you have ideas for another type of approach, by all means discuss it with a member of the staff. Try not to become "bogged down" in fine detail but try to develop the major facts and information. (Remember that this information may not be teachable in one or even several lessons.) It is designed to give the user a body of information which he may pick and choose from in preparing his lessons in his particular situation.

4. **EVALUATION:**

Under this heading, suggestions should be made for evaluation activities or devices which the teacher may use to determine whether the students have acquired an understanding of the major concept and information related to it. The following examples might be used: situation analysis questions, performance tests, case studies, observations, reports, etc.

5. **REFERENCES:**

Each topic should show at least one or more sources of additional information or student reference material to be used with the topic. References may be shown as follows: Smith, The Elements of Industry, p. 47-49. The complete reference should be shown in the resources section at the end of the unit.

EXAMPLE:

A. **TITLE:** *Employment Procedures*

1. **CONCEPTS:**

There are specific employment procedures that industry uses. Those who apply for work in industry should follow these procedures. There may be some variation in the order that is followed in employing workers in various industries.

2. **INTRODUCTION:**

This topic would be appropriate at the beginning of a course in industrial arts. It could be very effective at the outset in the operation of a mass production unit.

It will probably be most effective if this topic is supplemented with a meaningful activity or activities such as an interview demonstration, completing applications, or taking employment tests.

3. **PRESENTATION:**

a. *Why does industry have an employment procedure?*

b. *Advantages of employment procedure.*
   (1) *Screens for the most favorable applicants.*
   (2) *Reduces labor turnover.*
   (3) *Helps to place the applicant into suitable work based on his abilities and company needs.*
   (4) *Allows for formal induction to work, foreman, supervisor, requirements and benefits.*
   (5) *Provides for a follow-up review and check within specified periods of time.*

c. *Example of an employment procedure.*
   (1) *Reception of applicant.*
   (2) *Screening interview.*
   (3) *Completion of application form.*
   (4) *Employment tests.*
   (5) *Patterned interview.*
   (6) *Investigation into background.*
   (7) *Selection by foreman or supervisor.*
   (8) *Medical examination.*
   (9) *Placement.*
   (10) *Induction.*
   (11) *Follow-up.*

4. ***EVALUATION:***

a. *Review and evaluate resumes prepared by students on their qualifications for 3 different job descriptions.*

b. *Review and evaluate a role-playing activity related to an interview procedure involving students and possibly the school guidance counselor.*

5. ***REFERENCES:***

a. *Musselman and Hughes, Introduction to Modern Business, pp. 212-221.*

b. *Amrine, Ritchey, and Hulley, Manufacturing Organization and Management, pp. 337-346.*

III ACTIVITIES

Each activity listed on the brief outline should be expanded to include definite suggestions as to how the activity could be used to augment the information contained in the lesson topic. Remember that each individual may not see the activity as being as useful as you do. However, your suggestions may give the user ideas which he may expand or modify for his own needs. Try to use your imagination but also try to be realistic.

EXAMPLE:

A. ***ACTIVITY:***

Design, develop, construct and administer manual dexterity tests with industrial arts students. This activity may be an individual, group, or class project.

1. *The manual dexterity evaluative instrument could take many forms. Perhaps a specific task to be performed could be identified and the test designed about the task.*

2. *As an example, if a worker is required to assemble a series of small parts in an isolated work area, such as putting washers and nuts on bolts while sitting at a bench, this process could be simplified to determine how fast and accurate a worker can perform a job.*

3. *A manual dexterity test could be designed and constructed to determine the above for not only the job described above but also for many similar jobs.*

4. *Frequently these tests require that a person pick up pegs from supply bins and place them onto a rack. This may be done with one or both hands.*

5. *The frequency of correct responses in a given period of time would be evaluated.*

IV RESOURCES:

List all resources which are relevant to the unit in proper bibliographical form. Give complete information regarding author, title, publisher, date, pages, chapters, etc. which will allow the reader to pinpoint the resource in the event he may want to secure the material. List various materials under proper headings such as books, periodicals, pamphlets, films, etc.

EXAMPLE:

A. *BOOKS.*

1. *Amrine, H. T.; Ritchey, J. A.; and Hulley, O. S.; Manufacturing Organization and Management. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966, 2nd Ed.*

B. *PERIODICALS.*

C. *FILMS.*

D. *OTHERS.*

V FINAL ASSEMBLY AND REPRODUCTION:

A. TITLE PAGE (see example)

The title page should contain the following information:

1. Area under study such as: Production, Financial Control, etc.
2. Names of committee members who have developed the units.
3. Names of the units contained in the work.
4. Directed Field Study in Industry.
5. Date.

B. REPRODUCTION

After completing your first unit in draft form, have it reviewed by the field study coordinator for organization, content, and correct format. After approval, this unit and all others should be typed in final form on ditto masters provided. Use of ditto machine will be demonstrated.

In some cases, you may have material which you have gathered during your stay in industry which you may wish to reproduce and include in the report. Thermo-fax ditto masters are available which can be used for this purpose. Check with the coordinator if you wish to reproduce anything of this nature.

C. TABS

Each committee will tab all copies of their work according to the layout on the accompanying sheet. Resource unit sections should be tabbed according to the attached diagram. The tabs should be attached at the appropriate place on the title page. Ask the coordinator for the tab material when you are ready to assemble the report.

D. ASSEMBLING REPORT

Run off and collate the number of copies of your units indicated by the coordinator and staple (one staple) each copy in the upper left hand corner. Drill each copy for 3 ring notebook use and turn in all copies to the coordinator. At the time when you give your presentation on the units you have developed, you will distribute copies of your work to each class member. Several copies will be retained for staff and file use.

VI PRESENTATION AND DISCUSSION

Each committee will be expected to make a presentation on the resource units produced to the entire group in order that maximum benefit may be derived by each individual in the Field Study.

This presentation and explanation will provide opportunity for others to ask questions and become generally familiar with the materials produced.

Each committee presentation should attempt to explain:

1. The rationale of the committee's thinking in developing the unit.

2. The most important or unusual activities or resources suggested.

3. Level or class for which the unit seems most appropriate.

AREA: Industrial Relations

CATEGORY: Employment

CONCEPTUAL STATEMENT: When industries effectively use employment procedures, desirable employees may be selected according to employer needs and employee interest and ability.

I SUB-CONCEPTS

A. Individuals who apply for specific jobs should be aware of the education and skill requirements before applying.

B. Workers attitude, cooperation, ability to accept and adapt to change, willingness to work with others are key ingredients for occupational success.

C. Applicants who apply for jobs according to prescribed procedures are more likely to be successful in acquiring the job than those who do not follow said procedures.

D. Individual employee productive contribution must exceed the direct and indirect remunerations he receives.

II LESSON TOPICS

A. Employment Procedures

B. Preparing Applications

C. Employment Testing
   1. Manual Dexterity
   2. Specific Skills
   3. Personality
   4. Occupational Interest
   5. Others

D. Interviewing

III ACTIVITIES

A. Develop and administer manual dexterity tests with students.

B. Develop and administer testing to evaluate manual skill ability for a particular job.

C. Have students fill out a standard application form for a specific industrial job.

D. Have students apply for a specific job that must be done (during a production unit). Each student would be interviewed and considered in light of his interests and experience and the needs of the program. Interviewers could be older students, the teacher or other industrial arts teachers.

E. Cause the students to become familiar with occupational reports and handbooks.

IV RESOURCES

A. Books

  1. Amrine and others, Manufacturing Organization and Management.

B. Periodicals

  1. U.S.Department of Commerce, Survey of Current Business.

C. Films

  1. "Employment Interviews"

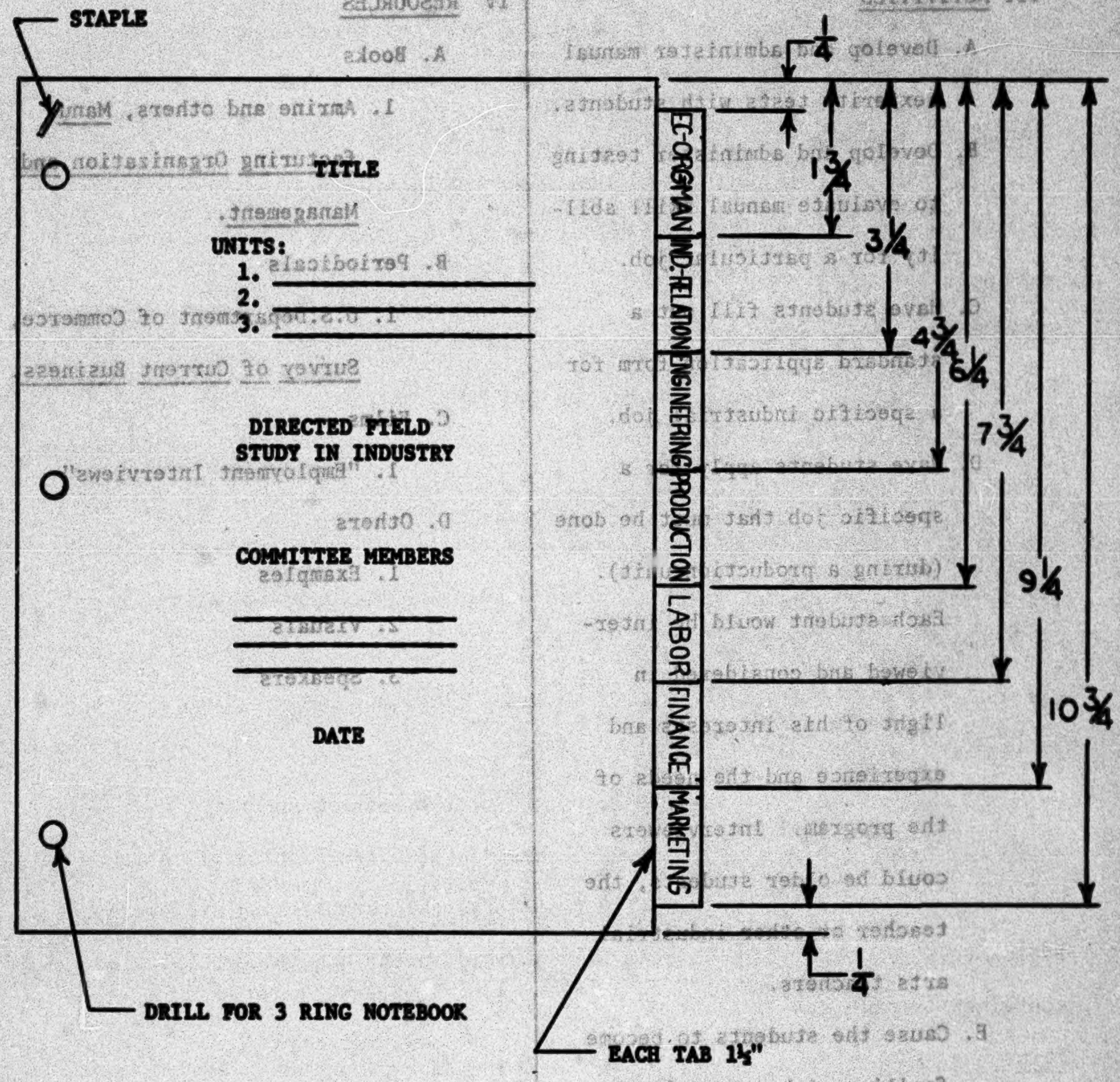
D. Others

  1. Examples
  2. Visuals
  3. Speakers

SUGGESTED TITLE PAGE LAYOUT

AND

TAB LAYOUT


STAPLE
TITLE
UNITS:
1.
2.
3.
DIRECTED FIELD STUDY IN INDUSTRY
COMMITTEE MEMBERS
DATE
DRILL FOR 3 RING NOTEBOOK
EACH TAB 1½"
ED-ORG.MAN
IND. RELATION
ENGINEERING
PRODUCTION
LABOR
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MARKETING
1/4
1 3/4
3 1/4
4 3/4
6 1/4
7 3/4
9 1/4
10 3/4
1/4

Field Study Resources

In order to operate a Field Study program of this type it was recognized that a special collection of resource materials would have to be made and evaluated to determine, from those available, what were most appropriate for use at the college level. It was also recognized that these resources should be collected from many fields and sources not commonly used in industrial arts. Resources which were finally identified and selected for use were collected and kept intact for the primary use of students in the Field Study.

Texts and References

From the very early preliminary stages of this project the staff gathered for review and critical evaluation all known text references that were current and applicable to all operational phases of the Field Study program as well as those references that might provide guidance in structuring, organizing, and evaluating the curricular materials to be produced.

Suggestions of sources of text references were solicited from industrial personnel, student participants, other division faculty, publishers, advisory council members, and faculty from other disciplines of this and other colleges. All known publishers of texts and references in the field of industrial management and organization were contacted for review copies of recommended new and current editions. Excellent cooperation and assistance was provided from all sources contacted.

As a result of a critical examination of the several hundred text references reviewed, the project staff established a selected listing of those texts which were considered to be minimally essential for establishing and operating a Field Study program. This listing is contained in the annotated bibliography contained in Appendix D.

Films

As a continuous process during the entire project the staff, with the cooperation of the college audio-visual center staff also reviewed all known sources of 16mm. instructional films that might apply to all phases of the Field Study project.

In reviewing the many catalogues from the major college and university libraries, private sources, industrial, labor and international film listings, all appropriate films were scheduled for previewing. These films were critically evaluated by the project staff, by students, and by other college faculty and industrial personnel.

As a result of this thorough analysis and evaluation, approximately one hundred films were selected for review during this two-year period. Of this number, some fifty-three titles appear on the annotated film listing contained in Appendix D.

Student Resource File

In order to supplement the Field Study text and reference library, composed of those titles on the annotated bibliography, a student resource file was compiled. This file, bound in an expanding fibre board pocket, was charged out to each student at the outset of the program for the students' reference and use during the program.

The file was developed from a careful review of a number of pamphlets, brochures, government publications, union literature and other sources covering all the related phases of the program. The resources provided general background information and reading in such areas as industrial economics, industrial and labor relations, unions, research and development and industrial organization and management.

The file is provided the students not only as a resource to the college students, but also as representative literature which might be used with public school students in providing them with a better orientation and understanding in certain areas. Most of the publications may be obtained in quantities without cost.

A complete listing of selected resources which may be used to develop such a file is contained in Appendix D.

Periodicals

A vast number of periodicals and trade journals exist outside the professional literature of industrial arts teachers. Many of these publications are not normally found in a library but are extremely valuable to the industrial arts teacher educator desiring to keep currently informed of new technological developments and the trends and forces affecting industry. A large number of these pbulications were obtained and revised for their value in the Field Study. An annotated list of the most worthwhile publications is contained in Appendix D.

Student Workbook

One of the major objectives of this project was the development of a guide or workbook which would help students seek out meaningful information and direct their effort while assigned to an industry.

The workbook was developed originally in cooperation with a number of industrial personnel and staff who reviewed the various sections of the book. Feedback from industrial personnel and students using the workbook was a continual source of information which has been applied to numerous revisions of the wording and content. The final workbook has been reviewed by industrial personnel and the project advisory committee and meets with their general acceptance and approval.

The workbook is organized into seven major categories which parallel and complement the general plan of the program as explained in Chapter II. Sections of the workbook include: Introductory Seminars, Industrial Relations, Engineering, Production, Labor, Finance and Marketing. An explanation is included at the beginning of the workbook which provides the student with a general description of how he should use the workbook as well as general suggestions to be followed in observing and studying the industry.

Each section of the workbook provides a statement of the purposes of the section, references which are applicable to the content, space for notes on speakers, an outline and key questions to guide the student's inquiry, and an application section consisting of space for occupational information, industry matrix, and concept development and application.

It must be noted that this workbook has werked very well in directing the students in this program as it is operated at this institution and with the group of industries in this area. However, if this workbook is used in a significantly different type of program or with a largely different group of industries, some adjustment of the content may be necessary. It is, however, a general enough workbook to be used in a variety of industries and programs with success.

It should also be recognized that, in preparing a workbook for general application and use with many types of industries, certain questions may not apply in all cases. In such cases the student will have to use more of his own initiative in selecting the information which is important to be included.

In practice, the students secure two copies of the workbook. One copy is used to take notes while discussing the various aspects of the area of industry under study with the appropriate industrial personnel and at weekly seminars. This copy is the working copy and need only have penciled notes by the student.

The second copy of the workbook is taken apart and the appropriate notations typed in, using the notes previously obtained in the working copy. The typed copy of the section under study is turned in each week so that it may be reviewed by the staff. After reviewing the weekly work done by each student, the coordinator makes appropriate comments on a separate sheet which is returned, along with the student's work, so that the student can be aware of the quality of his work and, where necessary, his attention may be directed to any specific shortcomings.

The complete workbook is included in this report in Appendix F.

Guide to Industrial Personnel

During the operation of the Field Study program, visitations to the students while they were in the industrial setting were made to help answer questions from both the students and the industrial personnel who worked with them. Since most questions asked by the industrial personnel during these visits were very similar from industry to industry, it was apparent that a guide needed to be developed which could be used to answer these questions. This guide was developed to explain various aspects of the program to industrial personnel who are involved in the program for the first time, such as when a new industrial plant is to participate in the program.

The contents of the guide explain, in brief form, the nature of the program, the nature of industrial arts, the types of students who will be involved in the program, the organization of the program, and the responsibilities of the industrial personnel, the students and the college personnel in the program. Suggestions and possible schedule arrangements which may be helpful for the industrial personnel in working with the program are also included. The guide essentially gives the industrial personnel a good overview of the complete operation and intended purposes of the program.

The guide was developed by the staff based on the experience they gained from working with the program and the industrial personnel. The industrial personnel requested that the guide be concise, and contain only essential information. To meet this request great detail was avoided. Copies of the guide were distributed to selected industrial personnel for their reactions and comments. Minor revisions were made, based on this feedback, and a final guide was duplicated.

Approximately six copies of the Guide To Industrial Personnel were distributed to each of the industries involved in the program so that copies would be available to all of the key personnel who would come into contact with the students.

The usefulness of the guide in this program has been most satisfactory. extensive use of the guide in this program which has already been established is somewhat limited, since personnel in the cooperating industries with whom this program is working have, over the period of the study, gained experience with the program and the procedures being followed. They therefore use the guide for reference purposes and to familiarize personnel with the program who will be working with it for the first time.

The complete Guide To Industrial Personnel as it is currently being used in the program is contained in Appendix F. This guide, along with the workbook, gives all personnel the information needed to effectively work with the program. The full usefulness of the guide would be more apparent in the initial set-up and operation of a program of this nature in a totally new situation. The guide will also be extremely valuable in the orientation and introduction of new industries and personnel in the existing program.

Identification of Concepts about Industry

One of the objectives of this research was to attempt, on an experimental basis, to determine whether students who had been exposed to the Field Study experience could identify important concepts about American industry which would be useful in determining what should be taught to public school students.

It was hypothesized that if students were permitted to observe and study industry over a period of time, certain concepts would be commonly identified by many students. Concepts which were recognized with a high degree of frequency could then represent some of the most critically important concepts to be taught to their students.

The procedure as described in Chapter II was used to collect and tabulate all concepts identified by the students and these were placed in a cumulative pool for final analysis and review.

The results of the cumulative tabulation and review of the industrial concept statements are summarized in this section as taken from the total cumulative tabulation which may be reviewed in Appendix G.

The student industrial concept statements identified during the four operational phases of this project totalled 326 different statements and 1,722 total student responses. These conceptual statements are grouped by the six major categories of industry and their sub-elements as they were received from the students.

For the purpose of summarization, the most important statements which were recognized by the students, having a frequency of ten or more, are identified in the following list. Also included in this list are student conceptual statements which were noted less frequently but were recognized by authorities and specialists from the industrial advisory council and project staff as being very important. These statements are preceded by an asterisk (*). The number in parenthesis ( ) preceding other statements indicates the frequency with which these statements were identified by the student participants during the course of the project.

The project staff has made no attempt to alter any statement nor have the statements been placed in any rank order of importance. It should be recognized in reviewing these statements that they represent the empirical observations and the generalizations of undergraduate students. While suggestions and guidance on the wording of conceptual statements were provided initially, very little stress or emphasis was placed on this aspect of the student's work in order not to inhibit their recording of those concepts which they had acquired. The statements, therefore, are not highly refined nor carefully structured.

To provide greater insight and understanding into the results obtained relating to the total different statements and total number of responses identified by the four student groups, two tables have been prepared.

Table I explains the total response relationship between each of the four student groups and each major industrial category. It should be noted that the volume of responses in the student groups varied from a high of 559 to a low of 359. Again, a variation exists between the industrial categories where Industrial Relations received 351 total responses and Labor had 228. The sum total of all responses was 1,722.

Table II shows the relationship between the student concept statements and the total responses received. This relationship is treated according to the major elements of industry. This table shows that a total of 326 different statements were received and tabulated. The number of statements in each major category is also shown.

Interpretation of the Data

The results of the summary tabulation as shown in Table II reveal that, of the 326 separate conceptual statements identified, forty-four or 13.5% of the statements were identified by 10 or more students, with one statement expressed by 40 of the 59 students in the program.

Those statements identified by less than 10 students show the wide range of recognized concepts which the students were able to identify.

Table I

SUMMARY OF STUDENT CONCEPT STATEMENT TABULATION

Total Responses By Student Group and Category

	STUDENT GROUP				
CATEGORY	I	II	III	IV	TOTAL
Industrial Relations	64	90	99	98	351
Engineering	50	44	88	67	249
Production	62	75	106	72	315
Labor	56	54	75	43	228
Finance	63	55	95	76	289
Marketing	64	60	96	70	290
Total	359	378	559	426	1722

Explanatory Note: The student groups refer to the four groups, each consisting of 15 students, which participated in the program over a two year period.

TABLE II

SUMMARY OF STUDENT INDUSTRIAL CONCEPT STATEMENTS

NUMBER OF RESPONSES PER STATEMENT	IND. REL	ENGINEERING	PRODUCTION	LABOR	FINANCE	MARKETING
40			1			
39						
38						
37						
36						
35						
34						
33						
32	1				1	
31						
30						
29						1
28						
27						
26						
25		1				
24						
23						
22						
21	3*			1	1	
20						
19	1		1			
18					1	
17			2		1	
16		1			1	
15			1			
14				1		1
13	1	1			1	2
12	1	2		1	1	1
11				1	1	2
10	1	2	4		1	
9		2	1	2	1	3
8	4	2	2	2		3
7	4	2	3		6	3
6	5	4	4	6		3
5	2	5	5	4	2	4
4	8	6	10	8	7	7
3	10	5	4	5	6	6
2	11	5	9	10	8	10
1	16	5	2	13	16	11
No. of Different Statements	68	43	49	54	55	57
						326

NOTE: The number in each category column indicates the number of statements having a frequency response as shown by the number in the extreme left column. (Eg. The 3* in the industrial relations category indicates there were three different conceptual statements, each having a response of 21.) The final number at the bottom of each column refers to the total number of different statements in that category, and the number at the bottom right is the total number of different conceptual statements submitted.

Summary of Industrial Concept Statements

The statements extracted from the cumulative list have been arranged by major categories and sub-elements for review.

Industrial Relations

Industrial Organization

(19) 1. When a company organizes according to a set structure, the operations within the company will be carried out in an efficient, organized manner. When this organization is known and understood by all, maximum efficiency will result.

* 2. Companies which are divisions of larger corporations generally are regulated and receive guidance in respect to major policies from the parent company.

* 3. Industries are organized and function for the purpose of making a profit for the stockholders.

Employment

(21) 1. Individuals who apply for jobs according to prescribed and established procedures are more likely to be successful in acquiring the job than those who do not follow said procedures.

(13) 2. Individuals who apply for specific jobs should be aware of the education and skill requirements of the job before applying.

(10) 3. Job promotion is based on many factors including knowledge, ability, past performance, ability to work with others, initiative, etc.

* 4. Individual employee productive contributions must exceed the direct and indirect remunerations he receives.

* 5. Workers' attitude, cooperation, ability to accept and adapt to change, willingness and ability to work with others are key ingredients for occupational success.

* 6. When applying for a job, an individual should have some idea as to what he would like to do, what he is qualified for and what types of jobs are available.

Employee Development and Welfare

(12) 1. Employee morale is important to industry.

(21) 2. Fringe benefits to employees are generally highly beneficial to them. The actual value should not be overlooked by the employer or employee when considering the actual worth and costs involved.

* 3. Employee development and general welfare is in the interest of the employer.

* 4. Reward and/or recognition for high caliber work is desirable to both employee and employer.

* 5. Employee attitudes play a very large role in the success of any company.

Communications

(21) 1. An effective communications program is essential to both employee and employer.

* 2. Efficient communication in the production process can reduce the total unit costs of a product.

Safety

(32) 1. A good health and safety program is important to both employee and employer.

Wage and Salary Administration

* 1. The level of responsibility usually is reflected in the compensation and generally the greater the responsibility, the higher the compensation.

* 2. As an employee becomes of more value to a company, through experience or knowledge, he increases his chances for promotion and greater compensation.

Labor Relations

* 1. The contractual agreement between management and labor is the ultimate guide for day-to-day labor relations.

* 2. A good working relationship must exist between labor and management.

Engineering

Development

(13) 1. When pilot plants, prototypes or models are utilized in the development stage, there can result a better-designed final product and a saving of time, labor and money.

(12) 2. When a company utilizes industrial research and development to develop new and better products and processes and better ways of producing and using old products, it is better able to compete with others.

* 3. As the technology of processing advances it becomes necessary for engineers to specialize.

* 4. When a customer has a new product requirement, a company will try to meet that need and develop such a product.

Research (Pure and Applied)

(16) 1. An effective research program (applied) will assist the company in keeping up with competition and produce new products.

* 2. The problem-solving ability of individuals can be utilized in research.

* 3. Research and/or development may be contracted out to a firm that specializes in only this kind of work.

Product Engineering

(25) 1. When standards are established in engineering, unnecessary duplication and repetition will be minimized.

(10) 2. The use of well-developed drawings which reflect standards and specifications are an important means of communication.

(12) 3. When future trends and developments are properly analyzed and forecast, better engineering production and products will result.

(10) 4. Before a product can be manufactured, it must be designed and tested so that it will serve its function and meet any required standards.

* 5. When several manufacturers produce the same or similar items, associations are often formed which may have the function of establishing standards for that industry.

* 6. Competition is often a factor in the redesign of a product.

Plant Engineering (Installation & Maintenance Only)

* 1. When maintenance is neglected the cost of production will increase over a period of time.

Production

Manufacturing Engineering

(17) 1. When time and motion-study studies are properly used, they work to advantage of both workers and management.

(10) 2. In order to produce a quality product, good tooling is necessary.

(10) 3. The most effective use of material handling equipment will reduce production cost.

* 4. When workers establish a uniform pace, more work will be accomplished than when they work at an intermittent pace.

* 5. Work standards determine how fast and/or how hard a worker must perform, therefore these standards are of vital interest to the labor force and are frequently negotiable in contractual terms.

Quality Control

(15) 1. Quality control is an essential part of production.

(10) 2. If used correctly, a quality control organization will augment the overall efficiency and profit of the company.

(10) 3. Quality control, effectively used, will maintain standards and insure acceptable products.

* 4. When incentive programs are introduced, the quantity of work tends to increase while quality may decrease.

* 5. Recovery of scrap materials is important to industry and public.

* 6. When workers have professional pride and are most skillful, there is less need for quality control checks.

Production Planning and Control (Rout., Sched., Exped., etc.)

(17) 1. The use of proper scheduling procedures is important to insure good production principles.

(19) 2. Production planning consists of planning, routing, scheduling, and dispatching materials and processes for optimum production at minimum cost.

* 3. Automation is of utmost importance if an industry is to be competitive.

Plant Layout and Design

(40) 1. When the layout and placement of equipment in a shop are carefully considered, more efficiency and reduced costs of production are achieved.

Manufacturing (Parts Mfgring., Sub-Assemb., Assembly)

* 1. The employee in a manufacturing department should be flexible enough to work at several jobs.

* 2. In the actual manufacturing process, frequently parts must be made and sub-assemblies must be performed before final assembly can begin.

* 3. An effective assembly operation will keep worker movement to a minimum.

Labor

Grievances

(11) 1. A grievance procedure is needed to determine the worth of a grievance and to allow for individual recognition.

(14) 2. The grievance procedure established under union contract will provide for "airing" of all disputes concerning labor and management through recognized channels.

* 3. When grievances are settled on the lowest level possible it is best for both sides.

* 4. Most grievances are settled in either the first or second stage.

Apprenticeship Programs

* 1. Frequently a company will train its own people for specific skills. This is especially true when there is a shortage of labor.

* 2. Some industries provide time and/or funds for some employees to receive specific training or skills in institutions of higher learning rather than develop internal apprenticeship programs.

Collective Bargaining

* 1. Unions have several means by which to bring pressure upon employers and these include strikes, pickets, boycotts and lockouts.

* 2. Although a company has no union, its employees are affected by working conditions in neighboring companies which may or may not be unionized.

* 3. When representatives of the union and management bargain collectively, the end result is a contract that will be acceptable to both parties for a specified period of time, usually two to five years.

Employee Role and Obligations

* 1. When a worker feels he is an important part of the operation, is well informed, and that the management is aware of him as an individual, he usually has fewer complaints and finds a greater amount of satisfaction in his job.

* 2. The employee should be aware of the effects of automation and how it concerns him.

Organized Labor - Need, Value

(12) 1. Employees in a union shop should understand the union organization on local, state and national levels to be more effective in union-management relations.

(21) 2. Generally-accepted poor working conditions such as poor job security, working conditions, bad communications, etc. will often lead to organization of the workers into a union.

Financial Control

Financial Planning and Budgeting

(16) 1. When a budget is figured as closely as possible, it becomes a useful operating plan.

(12) 2. When an industry's annual report is properly (informatively) prepared, the stockholders can determine how much their investment is worth and how strong the company is.

(17) 3. Forecasting is the attempt to scientifically determine the needs of a company in the future such as: production volume, new space requirements, employee level, amount of necessary research and development.

* 4. A company may obtain capital needed for establishment or expansion by borrowing or selling part of the ownership of the company.

General Accounting

* 1. A company will run most successfully and profitably if good accounting procedures are practiced.

Cost Accounting

(18) 1. Cost analysis and accounting is an important factor in the successful management of a business.

(13) 2. When careful studies and analyses are made of operating, labor, and material costs, fairly accurate prices can be assigned to products.

* 3. Overhead costs are often not understood or obvious to the public but are vital and must be determined in costing products.

Inventory Control

(21) 1. When the inventory control department is effective a balance between inventory and production can be maintained.

Purchasing

(10) 1. When the purchasing department is able to obtain the best materials at the lowest price, production costs are reduced.

(11) 2. Competitive bidding for vendor parts allows the company to obtain lower prices and control the material quality.

* 3. Accurate and adequate lead time requirements are needed by the purchasing department.

* 4. Standardization of piece parts for several products can be a valuable economic factor.

Data Processing

(32) 1. When data processing is used, it will increase industry's efficiency and productivity.

* 2. Time is money in the business world and this is an important factor in the collection of outstanding money.

Marketing

Product Service and Customer Service

* 1. A function of customer service is to assist the customer with his problems and needs.

Packaging

* 1. Packaging in some form always exists between the producer and user and this function must be carefully designed, researched, planned, and undergo cost estimates.

Sales

* 1. A salesman should know his competitors' products as well as his own.

* 2. An effective salesman will communicate helpful information to both his company and the consumer.

Distribution

(11) 1. Many factors affect the choice of distribution channels for a product.

(13) 2. There are numerous channels for product distribution and many factors must be considered before a channel is chosen.

* 3. Effective distribution will be through channels that are as direct and economical as possible.

Advertising - Promotion

(11) 1. Main purpose of advertising is to pave the way for someone to make sales.

(14) 2. Packaging can serve many purposes including advertising.

(13) 3. Effective advertising will convince the consumer that the product or service being advertised will best serve his needs.

(12) 4. A promotion is an all-out effort to introduce a new product, increase sales, or enlarge the distribution in an existing territory or new geographical area.

* 5. Many companies find it more profitable to purchase advertising services than to provide this service themselves.

Market Research

(29) 1. A manufacturer must identify his market and its need before he can adequately serve the market through his product and/or service.

* 2. The marketing research specialist has a great effect on what products will be produced today, regardless of the apparent need.

Test - Understanding Concepts of Industry

The testing instrument, "Understanding Concepts of Industry," was developed during the last year of the operation of this research study. It was developed due to a recognized need for an instrument more suited to this specific program since the general instrument developed by Blomgren (81:Ch. II) did not adequately meet the needs of this project. The objective of the new test which was developed was to measure progress made by the students taking the program in acquiring knowledge and concepts about the various aspects of industry. It could also be used as a device to help assign grades for the course or to indicate relative academic position of the individual class members.

The test was developed by asking the students in one group to turn in three questions each week based on the concepts they identified during that week. In this way, the student not only helped the staff in obtaining test items but he helped himself in identifying and refining concepts as he made out the test items. At the end of the six-week Phase II period, approximately 270 test items were collected. These items were screened by the staff to remove duplication and poor items. A one-hundred item test was developed from the card file of remaining items. A second group of 15 students who subsequently completed the Field Study program also contributed test items which were used to add better worded questions.

The test items were analyzed by the staff according to procedures of item analysis outlined by Micheel and Karnes (33:458-472) and various changes were made in poor wording and structure of the items. Additional suggestions regarding the test items which were offered by interested industrial personnel have also been used to make the test more accurate and meaningful.

Although this test has not been administered to a sufficient number of students to develop any meaningful statistical measures of its validity or reliability, the staff believes that the results which have been obtained in its limited use indicate that this test could be developed into a statistically valid and reliable instrument.

The results of using this test as a pre-test on two groups of students indicated an average score of 72% for both groups. One group did not take the Field Study program and the other group did. Of the two groups who took this test as a post-test, the scores were 84% and 85%. One of these groups did not take the test as a pre-test, since it was not yet developed, and the other one did. These average scores indicate a measure of reliability since the results seem to be consistent. However, this is only an indication based on a small sample and different results could very well be evident with a larger group sample.

The following is a chart comparison of the test scores previously referred to.

GROUP	NO. IN GROUP	HIGH SCORE	LOW SCORE	RANGE	AVERAGE
Group I	12	80	62	18	72
Group II	15	84	53	31	72
Group III	15	92	69	23	84
Group IV	15	91	81	10	85

Group I: Industrial Arts College seniors who did not take the Field Study Program. (Pre-test)

Group II: Industrial Arts College seniors who enrolled and completed the Field Study Program. (Pre-test)

Group III: This is the same group as in Group II except that the test was given after completion of the Field Study Program. (Post-test)

Group IV: Industrial Arts College students who contributed items to make up the test while engaged in studying in the Field Study Program. (Post-test)

All scores based on 100%.

The test make-up as indicated on the following chart refers to the number of items in the test pertaining to each major subject area. It should be recognized that the test is designed to determine the student's understanding of concepts relative to the six areas mentioned and that use of the test in its present form should be limited to this purpose. Extensive revision of the test would be necessary in order to use it for high school programs which are considerably different from the Field Study Program conducted by this institution. This is in no way intended to discourage selective use of items contained in the test if the user desires to do so.

SUBJECT	NUMBER OF ITEMS
Industrial Relations	13
Engineering	19
Production	20
Labor	17
Finance	19
Marketing	12

Total Items = 100

A copy of the revised test and answer key is included in Appendix H. At present a second form of this test has been prepared but has not been administered. It is hoped that through administering both forms of the test in the future, enough data will be available to statistically validate the test.

Resource Unit Instruction Topics - Student Developed

Within each curriculum resource unit a number of instructional topics were selected for development by each committee in order to develop the basic concept and sub-concepts under the various elements of industry headings.

To summarize the results obtained from the student constructed resource units it may be noted that a wide variety of areas of industry have been dealt with. There were a total of 91 resource units completed by the committees. Forty-two of these units were on different subjects. These units listed by student group and elements of industry are shown in Table III on the following page.

TABLE III

RESOURCE UNITS DEVELOPED BY THE FOUR STUDENT GROUPS 1965-67

ELEMENTS OF INDUSTRY	GROUP I (Fall 1965)	GROUP II (Spring 1966)	GROUP III (Fall 1966)	GROUP IV (Spring 1967)
Industrial Economics, Organization and Management	1. Internal Ind. Org. 2. History of Ind. 3. Econ. Develop. of Ind.	1. Forms of Ownership 2. Economic Systems 3. Organizational Struc. 4. Functions of Mgnm.	1. Economic Systems 2. Role of Profit 3. Sources of Capital 4. Functions of Mgnm.	1. Unemployment 2. Basic Ind. Econ. 3. Forms of Ownership 4. Functions of Mgnm.
Industrial Relations	1. Employment 2. Safety 3. Wages, Benefits and Job Evaluation	1. Employment 2. Wage & Salary Adm. 3. Safety	1. Communications 2. Employment 3. Safety	1. Ind. Organization 2. Employment 3. Safety
Engineering	1. Product Eng. 2. Manufacturing Eng. 3. Plant Eng.	1. Product Eng. 2. Manufacturing Eng. 3. Plant Eng.	1. Research Eng. 2. Product Eng. 3. Manufacturing Eng. 4. Plant Eng.	1. Product Eng. 2. Development 3. Plant Eng.
Production	1. Manufacturing 2. Quality Control 3. Plant Location and Layout	1. Manufacturing 2. Quality Control 3. Production Plan. & Control	1. Manufacturing 2. Prod. Plan. & Cont. 3. Time & Motion Study	1. Quality Control 2. Prod. Plan. & Cont. 3. Mfg. Procedures
Labor	1. Org. of Unions 2. Collective Barg. 3. Apprenticeship Prog. 4. Grievance Procedures	1. Struc. of Unions 2. Collective Barg. 3. Apprenticeship and Training	1. Union Org. & Funct. 2. Grievance Procedure 3. Labor Force & The Individual	1. Org. & Funct. Unions 2. Collective Barg. 3. Grievance Procedures
Finance	1. General Accounting 2. Cost Accounting 3. Purchasing	1. The Profit Motive 2. Cost Accounting 3. Sources of Capital	1. Inventory Mgnm. 2. Accounting & Control 3. Purchasing	1. Purchasing 2. Cost Accounting 3. Financial Plan. & Budgeting
Marketing	1. Advertising 2. Packaging 3. Distribution	1. Distribution 2. Advertising 3. Market Research	1. Advertising 2. Distribution 3. Market Research 4. Packaging	1. Market Research 2. Advertising 3. Sales-Distribution

Lesson Topics Developed

In order to appreciate the extent to which the students delved into each of the areas, it is pointed out that a number of lesson topics and activities were identified for teaching purposes within each of the resource units. To appreciate the depth of understanding and comprehensive grasp of industry acquired by the student groups, it may be pointed out that a total of 253 lesson topics were developed by the four student groups. Two hundred and six of those completed were completely different topics.

The following list of topics indicates the unit titles and lesson titles developed by the student participants. Where a particular lesson topic was repeated by more than one committee, the actual number of lessons with this title is shown in parenthesis immediately following the title.

Industrial Economics, Organization and Management

A. Basic Industrial Economics

1. Comparison of the Three Basic Economic Systems (3)
2. Factors Influencing Production
3. Money Flow of Currency
4. Real Flow of Currency
5. Forms of Capitalistic Business Ownership

B. Sources of Capital

1. Capital: Types and Need
2. Equity Financing
3. Credit Financing

C. Economic Systems

1. Function of Economic Systems
2. Capitalism
3. Socialism
4. Communism
5. Competitive Markets
6. Ownership and Profits

D. The Role of Profit

1. Nature of Profit
2. Function of Profit

E. **Forms of Ownership**

1. Factors in Selecting a Form of Ownership
2. Forms of Ownership
3. Sole Proprietorship
4. General Partnership
5. Corporations
6. Cooperatives

F. **Functions of Management**

1. Decision Making, Managements Number One Function
2. Managerial Relations
3. Opportunities in Management
4. Management: A Joint Effort Toward a Common Goal
5. Management Planning
6. Functions of Management
7. Functions of Major Departments
8. Management - Direction and Control

G. **Industrial Organization Structure**

1. Corporate Organization
2. Small Business Organization
3. Organization Charts
4. Types of Industrial Organizations

H. **History of Industry**

1. Colonial Industry
2. Development of Mass Production Industries
3. Industrialization Development
4. What is Automation

I. **Unemployment**

1. Volume and Characteristics of Unemployment
2. Fluctuating Unemployment
3. Technical Unemployment

Industrial Relations

A. Employment

1. Employment Procedures (2)
2. Interview and Selection (2)
3. Industrial Application Procedures
4. Pre-employment Testing (2)
5. Selecting the Proper Job
6. Applying for a Job (2)
7. On-the-Job Training

B. Wage and Salary Administration

1. How Are Jobs Classified
2. Job Evaluation (2)
3. Development of Wage and Salary Schedules (2)
4. Exempt and Non-exempt Employee Compensation Methods
5. Federal Control of Wage and Salary Administration
6. Benefits and Protection Provided for Employees

C. Industrial Organization

1. Need for Industrial Organization
2. Industrial Organization Design
3. Industrial Organization Charts

D. Communications

1. Fundamentals of Industrial Communication
2. Communications in Industry
3. Standard Communication Practice
4. Innovations in Industrial Communications

E. Safety

1. Safety Programs in Industry (2)
2. Safety Engineering
3. Industrial Accidents - Causes and Prevention (2)
4. Cost of Accidents to Industries
5. Role of the Industry Safety Director
6. Factors Affecting Injury Rate
7. Safety Equipment
8. Safety and Automation
9. Shop Safety Practices

Engineering

A. Product Engineering

1. Product Design (2)
2. Standards, Tolerances and Specifications (4)
3. Product Testing (4)
4. New Product Development
5. Patents
6. Design of Components
7. Preparation of Industrial Specifications
8. Standardization in Mass Production

B. Development

1. Process and Product Development
2. Patents

C. Plant Engineering

1. Maintenance (3)
2. Plant Layout
3. Plant Services (2)
4. Maintenance and Installation
5. Plant Safety (3)
6. The Plant Engineer

D. Research

1. Pure Research
2. Applied Research

E. Manufacturing Engineering

1. Manufacturing Process Design (3)
2. Quality Control (3)
3. Tooling and Equipment (3)
4. Methods Engineering
5. Value Analysis
6. Economic Evaluation
7. Layout and Material Handling (2)
8. Time and Motion Study

Production

A. Production Planning and Control

1. Automation
2. Scheduling
3. Time Study
4. Production Planning Procedures (2)
5. Production Control and Replanning (2)
6. Production Cost Estimating

B. Manufacturing Procedures

1. Common Industrial Manufacturing Techniques
2. Planning Design and Material Flow
3. Inventory Control
4. Dispatching, Routing and Scheduling
5. Material Flow
6. Common Industrial Processes (Plastics and Metal)
7. Processing, Equipment, Accessories and Small Tools

C. Manufacturing

1. Stages in American Technology
2. Affects of Technology on Manufacturing Techniques
3. Impact of Technology on Society
4. Workers Role in Production
5. Types of Manufacturing
6. Industrial Waste

D. Time and Motion Study

1. Motion and Time Methods

E. Quality Control

1. Sampling and Statistics
2. Craftsmanship
3. Inspection Devices (2)
4. Precision
5. Product Quality - What Is It
6. Quality Control Standards and Techniques
7. Cost of Quality
8. Methods of Quality Control

F. Plant Location and Layout

1. Plant and Shop Layout
2. Choosing a Plant Location

Labor

A. Organization and Functions of Unions

1. History of Unions
2. Organization of the "Local"
3. Current Problems Facing Unions
4. Organizational Procedures (2)
5. Union Structure
6. Collective Bargaining
7. Organization and Structure of a Typical Union
8. Typical Union Membership
9. Two Types of Labor Unions (Industrial and Craft)

B. Collective Bargaining

1. Early Barriers to Collective Bargaining
2. Collective Bargaining Negotiation Procedures
3. Introduction to Collective Bargaining
4. Issues of Collective Bargaining
5. Collective Bargaining and the Workers

C. Grievance Procedures

1. What Is A Grievance (2)
2. The Grievance Procedure (3)
3. How the Grievance Procedure Aids Both Parties

D. Labor Force and the Individual

1. Demands and Responsibilities of the Individual Worker

E. Structure of Labor Unions

1. The Structure of Organized Labor Unions
2. How Locals Are Formed
3. Types of Locals

F. Apprenticeship and Training

1. Introduction to Employee Training Programs
2. Company Sponsored Training Programs
3. Trade Union Apprenticeship Programs
4. Industrial Union Training Programs
5. What Is Apprenticeship and How Does It Work

Financial Control

A. Financial Planning and Budgeting

1. Functions of Corporate Budgeting
2. Methods of Securing Industrial Financing

B. General Accounting

1. General Accounting - A Service to Industry
2. School Shop Supply Check System

C. Cost Accounting

1. Functions of Cost Accounting
2. Price Control
3. Cost Determination
4. "Costs" for Managerial Decisions
5. Control of Labor Costs
6. Cost Analysis
7. Cost Accounting and Production
8. Total Cost of Production
9. Time Card Organizational Systems

D. Sources of Capital

1. How Capital Is Acquired
2. Financing the Company

E. Profit Motive

1. Why Are Profits Necessary
2. What Is a Profit

F. Inventory Control Management

1. Inventory Turnover
2. Inventory Control

G. Purchasing

1. Functions of Purchasing (2)
2. Competitive Bidding for Purchased Parts
3. Development of a Purchase Requisition
4. Methods of Industrial Purchasing
5. Purchasing Department and the Companies Needs
6. Need for Engineering Experience in Industrial Purchasing
7. Purchasing Shop Materials

Marketing

A. Market Research

1. Introduction to Market Research
2. Industrial Markets
3. Consumer Markets
4. Types of Products
5. Methods of Market Research (2)
6. Factors Affecting Market Research
7. Techniques for Gathering Data (2)
8. Electronic Data Processing and Market Research
9. Utilization of Market Research Findings (2)
10. Areas Covered in Market Research

B. Sales and Distribution

1. What Is a Salesman
2. Distribution of Products (3)
3. Purposes and Function of Distribution Department
4. Channels of Distribution (2)
5. Warehousing
6. Sales Processing and Finished Goods Warehousing

C. Packaging

1. Packaging Design (3)
2. Promotional Advertising Sources
3. Factors Which Influence Packaging

D. Advertising

1. Advertising - An Information Device
2. Advertising Media Selection (3)
3. Advertising Services
4. Why Use an Advertising Agency
5. Slogans - Trade Marks - Symbols
6. Evaluating Advertisement Effectiveness
7. Advertising Copy
8. Advertising Agency Organizations
9. Career Opportunities in Advertising

CHAPTER IV

DISCUSSION

A rather detailed explanation of the various materials and procedures employed in conducting this experimental program has been treated in the previous chapters. Certain results obtained from this program warrant further comment to point up certain adjustments and factors which should receive special attention in operating a program of this type. These topics will be discussed in this chapter.

Experienced Teacher and Field Study Student Resource

In order to make the Field Study program more meaningful to students at the outset of the program, it may be helpful to have a student who has previously completed the program, or a teacher who is currently practicing some of the principles derived from the program, make a presentation to the students to answer questions during the early introductory on-campus phase of the operation. If a former student is utilized, he could point up the value to be gained from the program, his reactions and comments about the program, the identification of concepts and the importance of gathering information and concepts to be used in curriculum resource construction during the last phase of the program operation. The use of a former student gives the new students the benefit of the experience of someone who has recently gone through the program. This is usually more meaningful to the students than staff presentations on what the program is like.

If a former student is not available, a teacher who is currently practicing the principles which are involved in the Field Study may be most useful in making a presentation to the students. The students are usually very curious regarding how they will eventually put into practice what they learn during the Field Study, so the use of an experienced teacher can be helpful in meeting their need for information along these lines. The teacher should devote a good portion of his presentation to how principles and material learned in the Field Study experience could be implemented in teaching industrial arts. Examples of what he is currently doing in his own teaching would be pertinent and appropriate. The use of a practicing teacher also has the advantage of helping to develop a good attitude on the part of the Field Study students since they realize that soon they too will become teachers and must be able to function well in the classroom.

Industrial Guide Orientation

The group industrial tours provided each week during the second phase of the Field Study were generally helpful and informative. Specifically, they gave the students greater insight into a variety of materials, processes and techniques used in contemporary industry. Only occasionally, however, did these visits offer additional understanding and knowledge of the specific category of industry under study.

Tours through a variety of plants have the general value of providing broader perspective. The staff, however, came to recognize that taking a tour just for the sake of going through a plant contributes relatively little to any depth of understanding of some of the more important concepts which was the primary concern of the program.

Student Workbook - Matrix

The matrix section of the student workbook involves the comparison each week, by the students, of two different industries. In actual practice, this section has proven somewhat inadequate and the students have not derived the benefit from this portion of the workbook which it was designed to accomplish.

In particular, the matrix section, if not closely supervised, will usually turn into a copy session. This fact was noted frequently in the comments by the students at the end of the operation of the program.

The basis for the matrix section is to give the student the benefit of comparing other industries with the one in which he has been working for the week, and if this outcome can be obtained it will be helpful to the student in identifying major concepts. If this type of broadening experience is not employed, the student is in danger of getting a narrow, one-industry point of view regarding the subject under study during that week. Needless to say, a broad experience, for the purposes of this program, is most desirable.

A suggestion for making the matrix section more meaningful to the students is that the common elements of different industries be compared during a free discussion between the students and the Coordinator. Contributions should be made by all students with all students taking notes on the discussion for insertion into their workbook matrix.

The use of guest speakers to help lead meaningful discussions of common elements of the subject under study may also provide the students with information for completing the matrix section of the workbook.

The occupational information which is a part of the matrix is often difficult for the student to obtain from the industrial personnel. Since this information is subject to change and will probably be outdated by the time the student becomes a teacher, it may be more meaningful for the students to gather this information from a current copy of the Occupational Outlook Handbook. The identification of the various occupations could be done in the industries and by discussion in seminar.

The matrix section does represent one area where no clear cut solution to the problems encountered by the students has been found. This discussion and these suggestions may prove to clarify this problem and provide some thought as to possible solutions.

Curriculum Resource Units

A review of the student prepared resource unit indicates that each of the four groups that participated in this project developed an average of 23 complete units with an average of 63 individual lesson topic outlines per group. These represent considerable breadth and depth of understanding of the essential elements of industry. This can be achieved only when considerable latitude is allowed and encouragement of independent creative thinking is given by the Coordinator.

It should be noted that these are not refined nor fully developed in every detail. Concern was not for form but rather for quality, creative information and accuracy of the industrial data which would be of most value to those who have participated in this program.

Students should be encouraged to develop those diagrams, charts and examples as supplements to the resource units which will help to put across the information and concepts to their students. The representative examples contained in Appendix I are somewhat deficient in this regard because of the desire to conserve space.

It should be recognized also that the approach to be used in developing these curriculum resource units may be varied in several ways so that a single committee might be permitted or encouraged to develop a unit cutting across several elements of industry or a committee might confine its attention to a single element such as engineering.

A further variation of this aspect of the program might be to have the curriculum development work conducted the last two days of each week instead of concentrating all of the resource unit development in the final two weeks. A final week, however, would still be needed for an on-campus seminar for refining and reproducing the units. Several disadvantages of this arrangement can be seen, not least of which is the reducing of the time which the students would have each week for observation and study in the industries.

Experimentation in this aspect of the program is necessary to determine the most effective means of obtaining the best results.

Student Use of Text and Resource Packet

The extent to which students in this program utilized the text and resource packet needs to be carefully gauged. It is the belief of the project staff that these two very valuable sources of industrial information were not used as extensively as they could have been at times. While this factor was noticed with the first group it was not until after the second group had completed their program that the staff fully realized that the students were not making the best use of these resources.

With the two groups in the second year of operation the staff made specific attempts to point out the value of these resources and to encourage these students to make more and better use of them. During the operation of the program with the final group, brief weekly quizzes were given. The test questions were constructed so that only those who had read the "suggested" passages in the text or specific resources from the packet would be successful.

Experience has shown that the Field Study Coordinator will need to make a conscious effort to direct the students' attention to these materials in order to obtain the best results.

The Coordinator should further point out those items that will be most pertinent for use during the Field Study program and those most appropriate for use with public school children.

Student Industrial Concept Statements

In analyzing the quantity of student industrial concept statements the following should be considered. First, the total volume of responses from each student group varied considerably from a high of 559 to a low of 359 (See Table I). It is difficult to explain this wide variance as the causes are not clear and easily defined. One very real and possible consideration could be the students themselves. The project staff frequently remarked upon the noticeable differences between the groups. All staff were in agreement that Group III was an exceptionally "strong" group of participants.

Secondly, the total responses by category also had a high degree of variation (See Table III). This can be explained to some extent by the over-all interest of the students in a particular category, general exposure to different industrial resource personnel, and the quantity of data each group was exposed to.

All student-prepared concept statements were reviewed at the end of each week by the project staff and at the end of each operational period by the Field Study Advisory Council to determine technical accuracy.

It will be recognized that the statements vary greatly in their scope and style. Some are general or very comprehensive while others are more definitive or specific. Certain statements are extremely concise and others may be two or three sentences in length.

A large number of these concepts are quite valid and would have wide acceptance in the teaching of industrial arts. The project staff does recognize, however, that there are statements which are less important and have less potential use. It was felt that these should be included however, to show the range of thinking that undergraduate students are capable of carrying on.

The most significant aspect of the data obtained in this part of the research project is that it demonstrates the feasibility and effectiveness of requiring students to verbalize in writing those concepts which they have been able to identify. The data show a high degree of commonality of identified concepts. This was recognized by the students and was impressive on their thinking. This area holds rich possibilities for further research and experimentation by the profession.

Concepts of Industry - Basis for Curriculum Development

The opportunity and experience gained in operating the Field Study program to identify industrial concepts which may be used by the industrial arts teacher to project his thinking in developing curriculum has come to be recognized by the project staff as one of the most significant results of this study. This promises to have, perhaps, the greatest long-range effect on thinking and practice.

Although considerably more refinement and experience will be needed in order to more fully implement the approach to curriculum which has been given experimental tryout during this program, the preliminary results are most encouraging.

The operation of the Field Study program in itself, while it is important and captures the interest and attention of the students and general staff, is merely the vehicle for placing students in the type of learning situation that exposes them to the process of identifying concepts that are of primary importance. This one result of the program can well be one of the most significant aspects of this project.

Another and equally important outcome of this program can also be traced directly to the process of requiring the students in the program to examine their own thinking, observations and conclusions to make decisions about what should be taught in industrial arts.

Inducing the students to identify certain concepts for themselves as being important in contrast to telling them what they should teach represents the single most important step in the total process of learning.

When the potential teacher has been exposed to an experience and has been required to synthesize it and draw significant generalizations (concepts) that are considered important, he then can base the selection of lessons to be taught, activities to be conducted with students, and resources to be used upon a different rationale than has ever been proposed before.

It would be most unfortunate if the Field Study program were replicated without a full realization of the basic reason for operating the program - that of giving the students an awareness of the important concepts of industry which need to be developed in the minds of their students. It would be far less meaningful to merely accept the concepts identified in this study and then tell other industrial arts teachers that these are the ones to be taught.

Telling the teacher what concepts to teach is ineffective. The teacher must have the opportunity to identify the concepts for himself before he can effectively develop the curriculum and materials which will allow him to develop these same concepts in the minds of his students.

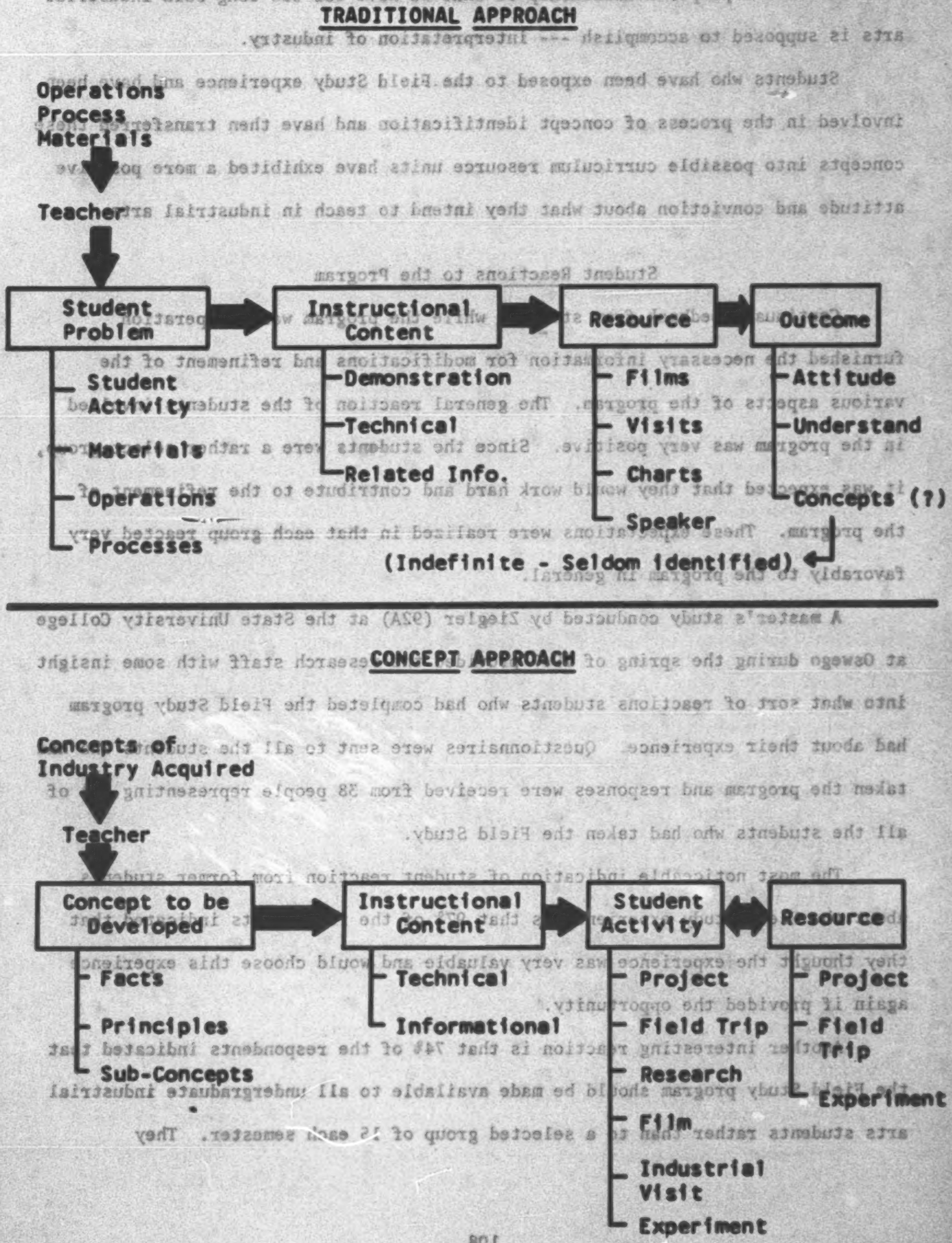
Concepts per se are not taught. The teacher can, however, establish the type of learning experience from which the learner can develop concepts which will be the determiners of the student's behavior.

The significance of this may be illustrated in Figure III where it may be seen that, in the traditional approach where the teacher has been primarily inducted into teaching from a background experience based upon an occupational analysis, materials operations, process background; he naturally applies this approach to his own teaching. This has placed the student activity (project) as the focul point of all curriculum considerations and too frequently becomes the *end* rather than the *means*.

When, however, the teacher has a clear realization of certain important concepts about industry that he wishes to develop in the minds of his students, the concept then becomes the determining factor of *what* the teacher will teach and *why* it should be taught. In this context the project is still a most important activity or, in certain instances, a resource which is used as a means of developing the concept.

The project, the experiment, or whatever activity seems most appropriate

Figure III


TRADITIONAL APPROACH
Operations
Process
Materials
Teacher
Student Problem
Student Activity
Materials
Operations
Processes
Instructional Content
Demonstration
Technical
Related Info.
Resource
Films
Visits
Charts
Speaker
Outcome
Attitude
Understand
Concepts (?)
(Indefinite - Seldom identified)
CONCEPT APPROACH
Concepts of Industry Acquired
Teacher
Concept to be Developed
Facts
Principles
Sub-Concepts
Instructional Content
Technical
Informational
Student Activity
Project
Field Trip
Research
Film
Industrial Visit
Experiment
Resource
Project
Field Trip
Experiment

now assumes its proper relationship to what we have for too long said industrial arts is supposed to accomplish --- interpretation of industry.

Students who have been exposed to the Field Study experience and have been involved in the process of concept identification and have then transferred these concepts into possible curriculum resource units have exhibited a more positive attitude and conviction about what they intend to teach in industrial arts.

Student Reactions to the Program

Continual feedback from students while the program was in operation furnished the necessary information for modifications and refinement of the various aspects of the program. The general reaction of the students involved in the program was very positive. Since the students were a rather select group, it was expected that they would work hard and contribute to the refinement of the program. These expectations were realized in that each group reacted very favorably to the program in general.

A master's study conducted by Ziegler (92A) at the State University College at Oswego during the spring of 1967 provided the research staff with some insight into what sort of reactions students who had completed the Field Study program had about their experience. Questionnaires were sent to all the students who had taken the program and responses were received from 38 people representing 55% of all the students who had taken the Field Study.

The most noticeable indication of student reaction from former students about the Field Study experience is that 97% of the respondents indicated that they thought the experience was very valuable and would choose this experience again if provided the opportunity.

Another interesting reaction is that 74% of the respondents indicated that the Field Study program should be made available to all undergraduate industrial arts students rather than to a selected group of 15 each semester. They apparently believe that the experience is so valuable that it should be made a part of every future industrial arts teacher's undergraduate training.

It appears that, of those who have had the Field Study experience and are now teaching, nearly all are either teaching courses or planning courses which will utilize the Field Study background they have received. From this reaction, it seems clear that the experience they have had in the program will be a strong positive influence on their teaching.

Since the period when the subjects of Ziegler's study went through the program, many alterations and improvements have been made. Nearly all the negative comments made by former Field Study students have been investigated by the staff and have resulted in modification and improvement of the program.

In general, the student responses indicate no serious deficiency in any area of the program, but instead reinforce the idea that this experience is a valuable part of their undergraduate training for becoming an industrial arts teacher.

Cooperating Industry's Reaction to Program

Near the end of the operation of the Field Study under the research grant, an effort was made to obtain reactions to the program from those industrial personnel who have worked with it. Comments were solicited from key personnel and the industrial coordinators in each participating industry asking for their reactions to such aspects of the program as: general organization and operation, college administration, company administration and responsibility, value to the student, value to the company, and suggestions for improving the program.

General comments regarding the program can best be indicated by including several of these comments at this time:

"I feel that this is a good program and gives these future teachers an excellent background and insight into industrial problems."

Grant Morehouse
Personnel Manager
Alcan Aluminum Corp.
Oswego, New York

"The student gets an excellent exposure to industrial people, operations, procedures and environment."

Harry V. Zahm, Ph.D.
Manager, Chemical Manufacturing
Bristol Laboratories
Syracuse, New York

"I wish other colleges and guidance counselors in high schools would imitate Oswego."

F. J. Toomey
New Process Gear
Chrysler Corporation
Syracuse, New York

"As you know, Crucible was one of the original companies participating in the Directed Field Study program. All of us at Crucible have felt that this program was very beneficial. I think one of the main reasons for its success was the intensive work you and your colleagues put into the program. It was detailed, specific and well managed. At the same time, the material was broad enough so the student could get the "big picture". It gave industry an opportunity to see today's college student, the leaders of tomorrow. All our students were, to our mind, above average and conducted themselves like gentlemen at all times.

Your staff's continual review with the Advisory Committee allowed the companies involved to feed back suggestions for betterment. We at Crucible, Syracuse, will be glad to participate in the future programs on this subject."

W. S. O'Neill
Manager - Employee and
Community Relations
Crucible Steel Company
Syracuse, New York

"I feel the Directed Field Study Program is of great value to the participants. Many of the students have worked in a laboring capacity only and have had no exposure to the management side of industry. In this program they gain an awareness of the problems of management and receive some insight into the planning, scheduling, coordinating, follow-up, and controlling necessary in an industrial organization. Through participation at staff meetings they observe the weighing of many factors and the considerations involved before an Engineering or Manufacturing decision can be made. They observe the problem-solving and decision-making by hundreds of people on a day-to-day basis at all levels of the company. Summing up, they gain a practical understanding of the economics of industry which should complement their theoretical training and make them more competent as instructors."

Crouse-Hinds Company
Syracuse, New York

Some responses which are directed to benefits or to value the company receives from participating in the program are as follows:

"I believe industry gains from this program, too. If industry tells its story well to these students, the word gets spread around that industry is not a bad place to work. In the end, this is beneficial to industry in that it helps attract good people for future employment."

Harry V. Zahm, Ph.D.
Manager, Chemical Manufacturing
Bristol Laboratories
Syracuse, New York

"The participating company indirectly benefits by realizing that it is under a close scrutiny by a very perceptive student. This realization takes time."

Edmund J. McMillan
Manager of Employee Services
Bristol Laboratories
Syracuse, New York

"The value to the participating company is in the knowledge that it is offering such opportunity to students and colleges. We recognize our company has a responsibility to the general community, and participating in this type program is one of many ways in which we fulfill this responsibility."

A. S. Anderson
Manager
Western Electric
Syracuse, New York

"As far as the Company is concerned, it is difficult to estimate the general value to the Company, since it seems as if this is one of the ways that we are contributing to the general education process of the student, as a community relations function. Perhaps those who talk with the boys have to organize what they present, and therefore have to take one more look at their functions than they perhaps otherwise would do."

Crouse-Hinds Company
Syracuse, New York

Responses to other areas such as the administration of the program were very positive and indicate that the program is well accepted by the industrial personnel who have worked with it.

Inasmuch as suggestions for improving the program are concerned, no broad changes were mentioned. The specific suggestions which were mentioned in a few cases parallel the thinking of the staff and have been utilized in forming the recommendations contained in this report.

With very few exceptions, the reaction to this program by industrial personnel who have participated in it has been very favorable. Credit must be given to these people for the concern and work they have contributed to making this endeavor a worthwhile venture for all concerned.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

As a result of the research conducted and the experiences gained in developing this pilot model Directed Field Study for industrial arts teachers, it has been possible for the project staff to draw certain conclusions which should be examined.

1. A pre-service experience which provides potential teachers with the opportunity to study at first-hand the operational phases of industry is an extremely meaningful and valuable addition to the undergraduate curriculum.
2. Providing an opportunity for students to work independently with reasonable latitude is a tremendous motivating force toward learning more about how industry can best be interpreted in the public school.
3. The process of having each student synthesize his observations and experiences into meaningful conceptual statements provides a sound background and foundation upon which the individual can base future choices and decisions relating to curriculum development.
4. If industrial arts teachers are to successfully interpret industry in their programs and classes in the public school, it is as important for them to understand the common elements of industry which compose the organizational and management structure as it is for them to know the technical and manipulative aspects of their subject.
5. The opportunity for undergraduate students to study industry at first hand and talk with industrial personnel concerning what students should be taught about industry is a strong positive influence on their attitude toward teaching. They also become aware of the interest and cooperation

which they can expect to receive from industry.

6. In order for the prospective teachers to acquire meaningful concepts about industry which they can use, they need to be able to concentrate their observation and study on each of the major elements long enough to provide for perceptual intake, differentiation, organization, decision making and tryout of ideas.

7. Students at this level can identify with a rather high degree of agreement the significant elements and concepts of industry. From the learning standpoint, it would appear that learning can be greatly enhanced when the students are given a greater responsibility for identifying structure and the general content of material to be included in the curriculum.

8. The general organization of the Field Study and the allocation of time to the three phases of the program provides for about the right balance of time to acquaint students with the necessary background information, develop concepts and transfer the concepts into useable curriculum plans.

9. There does not seem to be any significant evidence to show that students who have participated in the Field Study are more inclined to seek employment in industry than students who have not had this experience. A higher percentage of the students enrolled in the program during this study have gone on for graduate work after graduation.

Recommendations

The following recommendations are made based upon the experience and observations gained in conducting this research:

Recommendations pertaining to the Field Study Program:

1. To assist in the organizational phase of developing the program, it would be advisable to hold an orientation meeting of all industrial coordinators

to answer questions and clarify procedures. This meeting should be held at least one month before operating the program.

2. Where practical, in the larger companies, it is recommended that a meeting of key personnel within that industry who will be working with the Field Study students be scheduled to explain the purposes and operation of the program.

3. The matrix section of the student workbook should be modified, after tryout use, to improve the occupational information section. The use of guest speakers, open seminar discussion and use of The Occupational Outlook Handbook might prove more useful.

4. Further experimentation with a different allocation of time to various portions of the program and weekly seminar activities should be tried to determine the most efficient use of the time available.

5. More emphasis and attention should be directed toward the identification of student concepts in those subjects covered in the introductory seminars in order that the students may make greater use of these concepts in the development of curriculum resource units.

6. The Field Study Coordinator must continually search for and emphasize the effective use of the supplemental materials contained in the student resource packets. These materials should be included in the Coordinator's "list of materials" used to introduce each new topic.

7. Experimentation should be tried by changing the time when work is done on curriculum resource unit material. A portion of this work might be done on a weekly basis to compare with results achieved by having all of this work done in the final two weeks of the program.

8. After a program has become established, the weekly visits to students and industrial personnel by the Coordinator may be eliminated except in cases where new industries are used or where requested by the student or indus-

3

trial contact person.

9. Experimentation should be tried with alternative approaches to the development of curriculum resource units by student committees. Slightly larger committees might be tried to develop units longitudinally, cutting across all areas studied instead of vertically, exploring one area in depth as was carried on in this project.

10. This program should be carried on experimentally in conjunction with a technical laboratory course to follow the Field Study where the resource units might be tried out and the complete manufacturing process can be experimented with. Procedures could be developed for forming a company, financing, designing and engineering, production, material handling, marketing and distribution and the dissolving of the company as a compléte educational experience.

11. Adequate time must be provided for the Field Study Coordinator to do the necessary preliminary planning, administration and field contact work to establish the program. Time should also be provided for follow-up work and post-evaluation of the program.

12. The Field Study should be incorporated in the undergraduate curriculum as a separate course and should not take time away from the student teaching experience.

13. There should be as broad industrial arts staff involvement in the Field Study program as possible in order that all staff members may derive benefit from the industry contact and examination of industrial concepts developed.

14. The Field Study Coordinator should have a second person on the staff familiar enough with the program so that responsibility for coordinating the program may be alternated between them. This should foster in-service staff growth and greater feed-back to the college laboratories and classrooms.

15. To improve the effectiveness of the industrial tours, a brief orientation outline should be prepared to be presented to the industrial tour guides to explain the program and its objectives. When the guide has previous knowledge of the purpose of the visit and the nature of the group, a more worthwhile tour is provided.

16. The test on Understanding Concepts of Industry should be further refined and administered to more students to determine its validity and reliability statistically. Content of the test should be extended to areas of related knowledge about industry as well.

17. An appropriate means of recognition should be made to the cooperating industries to acknowledge their contribution and role in aiding higher education. Such recognition should result in promoting wider interest and cooperation between the college and area industries.

The following general recommendations apply to industrial arts teacher education growing out of this study:

1. Industrial arts teacher education institutions should develop techniques and procedures for keeping their staff current in the technological understandings in their field. Participation in conducting programs of the Field Study type could be most helpful in this regard.

2. Industrial arts teacher educators must attempt to spell out and define more imaginative and creative types of experiences which can be incorporated into the teacher education curriculum. Emphasis should be on the encouragement of students to do independent investigation and study in industry and industry-related topics.

3. Greater effort needs to be made to obtain and make available facilities to provide access to more current literature and studies outside the field of industrial arts to the staff and students. Such areas as

industrial psychology, industrial sociology, economics, industrial relations and industrial management should be included.

4. New texts should be prepared for use in industrial arts teacher education that deal with the organization and management of industry instead of dealing exclusively with the technical information of the field.

5. Experimentation should be conducted to develop graduate level field study experiences for industrial arts teachers in-service comparable to this program for those who have been teaching some time and who have not had the opportunity as undergraduates to gain the benefits of this type of program.

6. Colleges and universities preparing industrial arts teachers should make possible the granting of credit for approved planned independent study in industry to qualified teachers who may be employed in industry during the summer months.

7. Industrial arts teacher education institutions should develop at least one or more off-campus pilot centers in the public schools where new curriculum materials and teaching approaches can be tried and evaluated. These centers should utilize college staff members, student teachers and graduate fellows in cooperation with the cooperating school and teacher.

The following recommendations for further research are suggested as a result of the work done on this study:

1. A follow-up validation study should be conducted to prove or disprove some of the results obtained in this study particularly in the area of concept development.

2. A follow-up study should be conducted to evaluate in what ways and to what degree the Field Study experience has influenced the methods and effectiveness of the teachers who have been exposed to the Field Study

as compared to those who have not had this type of experience. Special attention should be directed to how much of the curriculum materials developed are used and the effect these have on the industrial arts curriculum.

3. A follow-up study should be made of graduates who have had the Field Study to determine what percentage go into occupations other than teaching and what percentage remain in these positions or return to teaching.
4. Parallel studies should be conducted in special technical areas of industrial arts to determine the feasibility of using the concept identification approach to develop bodies of content and important concepts to be taught in such areas as metals, ceramics, wood and others.
5. Experimentation should be conducted at the teacher education level to determine the most effective means of developing teachers who understand the method of concept development for use in teaching in the public school.

CHAPTER VI

SUMMARY

Rapid and dynamic changes have taken place in our society within the last decade with the future holding promise of even greater change. Many of the changes affecting our culture and society are attributed to the rapid advance of technology.

Industry represents one of the major elements of our technological society and, as such, must be recognized as a major societal institution which should be understood by all in education and most particularly by the teacher of industrial arts.

Rather general agreement has existed for some time regarding the central purpose of industrial arts as being the one principal subject in the school curriculum which should assume major responsibility for interpreting industry to students in a general education sense. Most of the emphasis in the preparation of industrial arts teachers, in the past, has been placed on the development of technical skills and understandings. As a consequence, the public school programs reflect the background preparation of the teacher. Relatively little attention or emphasis has been placed upon the broad understanding of how industry is organized and managed through its basic elements and sub-functions.

From a general education standpoint, it is considered equally important for students to understand the broad organizational structure of industry and how it functions as it is to acquire the technical skills and understandings used in industrial occupations.

The Problem

The problem as identified in this study was to recognize that most students who intend to become industrial arts teachers have had a very minimal, if any, real contact with industry. There was also a need to examine the structure of industry to develop a conceptual framework for the study of industry which industrial arts majors could be made aware of and be given an opportunity to observe and study through a directed experience.

Objectives of the Study

Specifically the objectives of this research project were:

1. To organize and develop a directed field study of modern industry for undergraduate majors in order that they might obtain first-hand experience for developing concepts and understanding of American industries.
2. To develop a guide for the organization and administration of a directed field study at the teacher education level.
3. To develop a student workbook and a guide for industrial personnel who would be participating in the program.
4. To identify those essential resources and materials which would be most useful in conducting a directed field study program.
5. To identify the central unifying concepts relating to industrial technology which industrial arts teachers need to understand for use in preparing curriculum materials to guide their teaching in the public school.

Review of Research

From the review of the related literature and research in the field of industrial arts education, it was shown that there is considerable agreement on the purpose and function which industrial arts should serve in the public school curriculum. A number of studies and approaches are in evidence or are in the process of being carried out proposing various approaches to curriculum structure.

The literature and research in the field of concept development and concept learning was examined as it related to the problem of identifying concepts. Substantial support was found for the hypothesis that, in order for concepts to be identified and developed, the individual must first have an experience from which certain percepts can be acquired. Involvement in the process of synthesizing and drawing generalizations is also seen an essential ingredient for concept identification and development.

Procedure

To carry out the objective of the research project a structure for a model curricular component was created, drawing upon the related research and the resources and guidance of a large number of industrial personnel and college staff members from other disciplines.

The program, as operated, was divided into three phases enrolling students who were scheduled for their second nine weeks of student teaching. Students were assigned during the operation of the program to 28 industries of various types within the radius of 50 miles of the college. The first phase of the program consists of one week of on-campus orientation seminars. The second phase is devoted to six weeks of concentrated study and observation of the major elements of industry. The third phase is devoted to two weeks of on-campus curriculum development workshop where major concepts and information gathered during the study in industry phase are used to develop curriculum resource units.

Guide to the Program and Administrative Procedures

The guidelines for establishing and operating a Directed Field Study and observation program as provided in this pilot project are contained in detail in Chapter III.

Specifically, the procedures for obtaining administrative approval, the selection of cooperating industries, orientation of industrial coordinating personnel, student and staff resource and instructional materials and required facilities are discussed and sufficient information provided to allow replication of this or a similar program in other teacher education institutions.

The position of Field Study Coordinator, who is responsible for operating the program, conducting major seminars, evaluating the program and students, and initiating desirable program changes is described fully. This person's qualifications are identified and explained. Other important aspects of the guide which will merit the attention of those interested in adopting such a program are also included as follows: time considerations, budgetary matters, student orientation, academic credit, evaluation, use of resources and the development of curriculum resources units by the students.

Seminar Resource Units

A significant result relating to objectives of this project was the development and construction of the twenty-one seminar resource units which were prepared by the project staff. These units are used by the program coordinator and industrial resource guest speakers in the three operational phases of the Field Study program.

The units developed for use in Phase I are primarily to orient the participants to the several background areas of industry such as industrial economics, industrial sociology, industrial psychology, industrial organization and structure. Six major units have been prepared for use in Phase II during the industrial study and observational period. These embrace the six major elements of industry. These units, prepared for use in the final phase, are designed to provide background and guidance for the students in developing curriculum materials.

These seminar resource units contain: a documented outline, selected references, supporting quotations, pertinent projectuals, and supplementary example materials.

Student Workbook

A student workbook was developed with the cooperation and effort of an advisory group from industry and staff personnel. This workbook provides part of the direction for the student while he is assigned to an industry. The workbook is structured according to the major elements of industry identified: Industrial Relations, Engineering, Marketing, Finance, Production and Labor. Provision is made in the workbook for noting information obtained from discussions with industrial personnel and from direct observation and study. Key questions are listed in the workbook for the purpose of guiding the student in his seeking of this information. Provision is also made for note-taking during seminars and while listening to guest speakers and films.

An application section at the end of each major section of the workbook provides room for noting major concepts which the student has identified, industrial information, and application suggestions for teaching the concepts.

This workbook represents a major result of the project and has proven to be a valuable instrument in the successful operation of the program. The complete workbook is found in Appendix E.

Guide to Industrial Personnel

A Guide to Industrial Personnel was developed which is used in orienting industrial personnel regarding the background and procedures of the program. This guide can be used to familiarize new personnel as well as new industries which may be used. Such topics as, the purposes of the program, organization of the program, type of student, college and industrial responsibilities, and suggested procedures for working with the student are included.

Copies of the Guide to Industrial Personnel are made available to all staff and industrial personnel who work with the program. The guide is included in Appendix F.

Identification of Concepts About Industry

One of the most important functions of this project was to experimentally determine whether the student participants who had been exposed to a directed industrial field study and observation experience could identify important and meaningful concepts about industry.

To identify and gather this data the participants were asked to write brief general statements of a conceptual nature relating to the elements of industry. These statements were collected, reviewed, categorized and tabulated at the end of each of the six weeks of Phase II. This process is explained in Chapter II and was repeated with each of the four student groups.

The tabulation of all student concept statements appears in Appendix G. A summarization of those statements recognized most frequently by the students are contained in Chapter III. The four student groups identified 326 different statements and 1,722 total responses were recorded.

Student Resource Units

Curriculum resource units were developed during the last phase of each operation of the program by the students. The use of concepts identified as a basis for the development of curriculum guides represents a new experimental approach to the procedure of identifying content and appropriate learning activities. Students were divided into committee groups and developed, with the use of their workbook and other resources available, curriculum materials which were shared with the rest of the class members.

A total of 91 curriculum resource units were developed by the groups who have participated in the program during the two year project. A total of 253 lesson titles or topics were developed in these 91 resource units. Since some of the topics selected by these students were repeated from group to group, the number of different resource units which were developed was 42. The number of different lesson topics developed was 206.

A representative set of these resource units of the type which each group of students prepared for essential use in teaching is included in Appendix I.

Conclusion and Recommendations

From the experiences gained in operating the pilot program and from the evaluation and review of the program operation and materials by the project staff, the project advisory committee, industrial specialists and others, a number of conclusions were derived. These conclusions support the value of including this type of program as an important undergraduate curricular component in the teacher education program.

It was also concluded, as a result of the evidence gathered, that students can and do identify with considerable agreement those concepts which are important for selecting curriculum content when they have been exposed to this type of experience.

A number of recommendations are made for further experimentation and further modifications which might be tried for improving the program.

Further research in the general area of concept development and concept learning is suggested for improving the teaching of industrial arts and the preparation of industrial arts teachers.

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APPENDIX A

ADMINISTRATIVE FORMS AND LETTERS

A DIRECTED FIELD STUDY
IN INDUSTRY

An Overview and
Explanation of the Program

State University College - Oswego, New York

Division of Industrial Arts and Technology

Department of Field Services

Dr. James Hastings
Mr. Howard Faulkner
Mr. Harry Hawkins

I THE NEED FOR A DIRECTED FIELD STUDY

This program is designed as a professional laboratory experience for junior and senior college students who are preparing to become public school industrial arts teachers.

These college students, in general, have had very little if any exposure or direct experience with the complex organization and processes of contemporary industry. Industrial arts teachers, who are to be responsible for interpreting and giving meaning and understanding to public school students of the many complex elements of industry, need a direct exposure to industry for a period of time and at a level which will permit them to acquire insights for interpreting effectively the social, economic, technical, and psychological concepts of American industry to their students. Such experiences are not a prerequisite for admission into the professional industrial arts teacher education curriculum. College courses, in general, cannot provide the integrated interpretation of concepts necessary for a sound understanding of current industrial organization and operation. It is the purpose of this program to provide this integrative experience.

II PURPOSES OF THE PROGRAM

It is hoped the following purposes will be achieved with those students selected for this program:

1. To provide future industrial arts teachers with a broad understanding of the function and organization of the major common elements of industry for interpretation in their classes.
2. To develop a fundamental understanding of the history and development of industry and labor and of the relationship and responsibilities of labor and management in our industrial society.
3. To develop an understanding of the principles of industrial sociology, industrial psychology, and industrial economics in future industrial arts teachers.
4. To give future industrial arts teachers an opportunity to identify the important concepts about American industry which need to be taught

at the public school level and to prepare curriculum resources for developing these concepts with public school students.

III STUDENTS ENROLLED IN THE PROGRAM

Students who will participate in this program are in the last half of their junior or the first half of their senior year, during the semester when they are scheduled for off-campus student teaching. Students selected will have satisfactorily completed one nine-week experience of student teaching and will be selected from those who have made application for assignment to this program. In-so-far as possible, they will be assigned to an industry which is related to their area of technical specialization in college.

IV TYPES OF PARTICIPATING INDUSTRIES

To achieve maximum learning benefit, effort will be made to have as many types, categories, and sizes of industries represented during any nine-week quarter as possible. It is hoped that representation from as many of the following classifications as possible can be achieved. This listing is not to be considered all inclusive.

A. Manufacturing industries
    1. Metal fabrication, production
    2. Wood fabrication
    3. Electronic
    4. Graphic Arts and Printing
    5. Other manufacturing, production

B. Transportation industries
    1. Land transportation
    2. Marine transportation
    3. Aviation

C. Communications industries
  1. Newspaper and other publication
  2. Telephone, telegraph, etc.
  3. Radio, television broadcasting

D. Construction industries
  1. Heavy construction - buildings and highways
  2. Architectural and Architectural Engineering

E. Primary refining
  1. Metal refining
  2. Non-metal refining

F. Service
  1. Utilities
  2. Repair centers

G. Food
  1. Processing
  2. Distribution

V ORGANIZATION OF THE PROGRAM

The nine-week program is divided into three major phases as outlined below:

PHASE I Introductory Seminar - On college campus

The first week is devoted to a study of the following topics:

A. History of Industry and Labor:

An overview of the origins and development of industry and labor organizations in America from colonial times to present.

B. Industrial Psychology:

An introduction to the effects of industry on the lives of individuals.

C. Industrial Sociology:

An introduction to the effects of industry on a community and of the community on industry.

D. Industrial Economics:

An overview of economic terminology and principles as they relate to American industry.

PHASE II Observation and Study in Industry

During the succeeding six weeks, one or two students are assigned to each cooperating industry for study and observation. One major topic is studied each week as outlined with the aid of the student field manual.

A. Industrial Relations:

1. Employment
2. Salary administration
3. Safety
4. Labor Relations
5. Employee training-retraining
6. Promotions, transfers, etc.
7. Termination of employment
8. Employee welfare
9. Communications

B. Engineering:

1. Research (Pure & Applied)
2. Development
    a. Process
    b. Product
3. Product testing
4. Plant engineering

C. Finance:

1. General Accounting
    a. Budget
    b. Invoicing
    c. Billing
    d. Data processing
    e. Payroll
2. Cost Accounting (Emphasize)
    a. Direct & Indirect Costs
    b. Profit determination
    c. Inventory control
    d. Pricing
3. Purchasing
4. Comptrollership

D. Manufacturing-Production:

1. Production-forecasting and planning
2. Material handling
3. Time and Motion study
4. Work standards
5. Manufacturing engineering
   a. Production-scheduling
   b. Quality control

E. Production-Labor (Part I - in industry):

1. Types of workers
2. Training needed and given
3. Job qualifications
4. Job descriptions
5. Work load determination
6. Worker responsibilities
7. Management-worker communications

Production-Labor (Part II - role and function of organized labor):

1. Types of unions
2. Operation and Responsibility
3. Training programs
4. Benefits
5. Current problems

F. Marketing:

1. Sales
2. Advertising
3. Packaging
4. Product analysis
5. Consumer research
6. Sales promotion
7. Pricing
8. Distribution system

PHASE III Culmination Seminar

During the eighth and ninth week, the students will be on campus to refine and review concepts and develop instructional materials for eventual use in teaching.

VI COLLEGE AND INDUSTRY RESPONSIBILITY

A. College - one staff member assigned to coordinate and operate the program

1. Make initial contacts with industry
2. Organize seminars

3. Conduct on-campus and weekly seminar periods
4. Conduct visitations and supervise students in industry
5. Review and evaluate student reports
6. Prepare student evaluations
7. Review and edit instruction materials developed
8. Prepare and administer pre and post-tests
9. Work with advisory committee in evaluation and refinement of program

B. Industry

1. Provide facilities necessary for student observation and study
2. Designate person to coordinate student assignment within industry
3. Make available reasonable amount of time of key employees in each major phase of study with whom student can work
4. Provide resource people for weekly seminar sessions when willing
5. When available, occasionally provide meeting facilities for Monday seminars
6. Submit a final evaluation report on students assigned to the industry on form provided by the college

VII STUDENT REFERENCES AND MANUALS

The following materials will be used by the students and staff in conducting this program:

TEXT: Amrine, Ritchey, Hulley, Manufacturing Organization and Management, 1966

Directed Field Study Manual

Resource File of Selected Bulletins

FIELD STUDY SCHEDULE

Week 1 PHASE I - INTRODUCTORY AND BACKGROUND SEMINARS (ON CAMPUS)

1. Industrial Psychology
2. Industrial Sociology
3. Industrial Economics
4. History of Industry & Labor
5. Organization of Industry
6. Guide to Observation
   (Curriculum Development Guidelines)

PHASE II - OBSERVATION AND STUDY IN INDUSTRY

Week 2	Industrial Relations
Week 3	Engineering
Week 4	Production
Week 5	Labor Part I - in industry Part II- special seminar
Week 6	Financial Control
Week 7	Marketing

Weekly Schedule

Monday: Introductory speaker and plant tour.

Tuesday, Wednesday, and Thursday: Industrial observation using special Field Study Guide.

Friday: Group seminar to review and summarize experiences and discuss concepts and activities.

PHASE III - CULMINATING SEMINARS (ON CAMPUS)

Week 8	Refinement of concepts and development of curriculum resource materials.
Week 9	Presentation and discussion of selected resource materials.

INDUSTRY DATA

COMPANY ____________________

ADDRESS ____________________

____

____

PHONE NUMBER ____________

OFFICERS: ____________ TITLE: ____________

____________ ____________

____________ ____________

COORDINATING
PERSON: ____________ PHONE ____________

TITLE: ____________

PRODUCT OR SERVICE: ____________________

NUMBER EMPLOYED: ____________________

UNION AFFILIATION: ____________________

MEETING FACILITIES: ____________________

SPECIAL NOTES:

DIRECTED FIELD STUDY IN INDUSTRY
(Company Survey)

Your cooperation in providing information on this form is necessary for program planning any assignment of students in The Directed Field Study next year. It would be appreciated if this form can be returned by June 15.

(Date)

Company:

Address:

Our company is interested in participating in the Directed Field Study Program next year. Yes No

We will be interested in participating during the following periods with the number of students indicated:

	One Student	Two Students
Period: November - January		
Period: March - May		
Both periods		

We would be willing to act as host for a Monday Seminar meeting by providing meeting room facilities and arrangements for lunch for approximately 18 students and staff on one occasion during the

Spring

Fall

Both

COMMENTS:

Signed:

Title:

STATE UNIVERSITY COLLEGE

Oswego, New York

DIRECTED FIELD STUDY IN INDUSTRY

COOPERATING COMPANY INFORMATION FOLDER

In order that each student may gain a general overview of the company to which he is to be assigned, we wish to compile a folder on each company which is cooperating in the Directed Field Study.

The information contained in the folder would be made available for review by the student assigned during the first week of on-campus seminar.

We would like to request your cooperation in making as much of the following information available as possible. If there are any other items which would be of assistance in acquainting the student with your company, this would be welcome.

a. Annual Report

b. List of key personnel and titles

c. Company new employee manual

d. Organization Chart

e. Products catalog - literature

f. Public information release

No. ________

Overall Index ________

Area of Technical Concentration ________

APPLICATION FOR ASSIGNMENT TO FIELD STUDY

1. ________ Last Name First ________ Age ________

2. ________ Oswego Address ________ Phone No. ________

Married ________

3. ________ Home Address ________ No. Children ________

Do You Own Car ________

4. **Previous Education Beyond High School:** **No. Hrs. Transfer:**

5. **List Your Reasons for Requesting This Assignment:**

6. **Industrial or Other Work Experience Since High School:**

Employer	Type Work	Length Time

STATE UNIVERSITY COLLEGE
Oswego, New York

TO:

FROM: Dr. James R. Hastings, Director, Directed Field Study

This is to notify you that you have been selected for assignment to the Directed Field Study in Industry for your second quarter of student teaching.

Industry:

Contact:

You will first report to the on-campus seminar in Room 303 Park at 9:00 AM on Monday, . You will report to the industry on Tuesday, . You will be notified of the dates for your vacation period during the first week of the seminar.

You should shortly contact the industry to:

1. Let the contact person know that you are acknowledging the assignment and express interest in the industry.
2. Indicate whether you will need assistance in locating housing. Do not expect much assistance, as this person is not accustomed to supplying this type of information.

This tentative assignment assumes that you will have satisfactorily completed all of the college and center requirements with the approval of your college supervisor in your first center.

Please notify me immediately if, for any reason, you cannot accept this assignment.

We shall look forward to working with you in this most interesting assignment next quarter.

STATE UNIVERSITY COLLEGE
Oswego, New York

Dear

This is to notify you that , who is a student in the Industrial Arts Division of our college has been selected for assignment to your industry for the period of to as a part of the Directed Field Study in Industry which is provided to selected students during the semester when they are scheduled for off-campus student teaching.

During this period of assignment the student will be studying various phases of your industry each week as shown on the enclosed schedule. On Monday and Friday of each week the individual will be engaged in a seminar conducted by a college staff member and personnel from the participating industries in the area. On Tuesday, Wednesday, and Thursday the individual will report to you or to some person whom you may designate for guided study of your industry.

We appreciate your cooperation and willingness to assist in this program which we feel will be most valuable in the preparation of industrial arts teachers.

Sincerely,

James R. Hastings
Project Director

JRH/mcl
Enc.

STATE UNIVERSITY COLLEGE
Oswego, New York

DIRECTED FIELD STUDY IN INDUSTRY CALENDAR

For your information and guidance in establishing your schedule of cooperation with the Directed Field Study in Industry, we are sending you the following calendar.

Week 1	INTRODUCTORY SEMINAR (on campus) 1. History of Industry 2. Industrial Psychology 3. Industrial Sociology 4. Industrial Economics	April 4 - 8
Week 2	INDUSTRIAL RELATIONS (In plants April 12-14)	April 11 - 15
Week 3	ENGINEERING IN INDUSTRY (In plants April 19-21)	April 18 - 22
Week 4	MANUFACTURING - PRODUCTION (In plants April 26-28)	April 25 - 29
Week 5	MANUFACTURING - LABOR (In plants May 3-5)	May 2 - 6
Week 6	FINANCIAL CONTROL (In plants May 10-12)	May 9 - 13
Week 7	MARKETING (In plants May 17-19)	May 16 - 20
Week 8	CULMINATING SEMINAR (On campus May 23-27)	May 23 - 27
Week 9	CULMINATING SEMINAR (On campus May 30-June 3)	May 30 - June 3

COMPLETED ASSIGNMENT CHECKOFF

Semester & Year ______________________ Coordinator ______________________

RATING

Very Good ..... +
Acceptable .... ✓
Poor 0

	name	Week 1						Week 2						Week 3						Week 4						Week 5						Week 6						Week 7						Week 8-9					
		SOCIOLOGY	PSYCHOLOGY	ORGANIZATION & MAN.	HISTORY-LABOR & IND.	ECONOMICS		CONCEPTS	MATRIX	ACTIVITIES				CONCEPTS	MATRIX	ACTIVITIES				CONCEPTS	MATRIX	ACTIVITIES				CONCEPTS	MATRIX	ACTIVITIES				CONCEPTS	MATRIX	ACTIVITIES				CONCEPTS	MATRIX	ACTIVITIES									
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STATE UNIVERSITY COLLEGE
Oswego, New York

Dear

The opportunity which we have had to work with you these past few weeks in the Directed Field Study for our industrial arts students has proven to be a most satisfying and rewarding experience for all concerned.

At this time we are anxious to obtain an appraisal of our student's work while he has been with you. Each student normally would receive an evaluation from the personnel in his student teaching center. The appraisal which you supply will be placed in the student's placement office folder in lieu of an appraisal which he would have received had he been in a public school teaching center these last few weeks.

We realize that you may not have had opportunity to observe the student directly in all situations, but would rely on you to provide a composite appraisal from information which you may gather from those who have been in direct contact with him in your industry. This record will become a most valuable addition to the student's placement folder. It will be very much appreciated if you will complete the enclosed form and return it to my by . The second copy of the evaluation is for your file.

We wish to express our sincere appreciation for the outstanding cooperation and assistance which you have extended to this program and shall look forward to a continuance of this relationship in the future.

Sincerely,

JRH/mcl
Encls.

James R. Hastings
Project Director

STATE UNIVERSITY COLLEGE
Oswego, New York

DIRECTED FIELD STUDY PERFORMANCE RECORD

Student's Name ______________________ Date of Report __________

Evaluator's Name ______________________ Company __________

DIRECTIONS: In the space provided after each item to be rated, please write an appropriate descriptive term which most adequately describes the candidate's performance as you have worked with him during the Directed Field Study in Industry Program.

1. Ability to comprehend information presented: ______________________

2. Ability to seek out additional information (facts): ______________________

3. Ability to ask intelligent questions: ______________________

4. Adaptability to new situations and circumstances: ______________________

5. Evidence of leadership shown: ______________________

6. Ability to communicate ideas verbally: ______________________

7. Personal appearance: ______________________

8. Emotional stability: ______________________

9. **Personal relationships with others:**

10. **Ability to accept responsibility:**

11. **Interest in learning new concepts:**

12. **Enthusiasm exhibited:**

13. **Initiative (drive, leadership, imagination) exhibited:**

14. **Evidence of insight and awareness of the problems of industry:**

Please add any supplemental comments explaining above ratings and any additional qualities or characteristics you feel should be noted.

State University College
Oswego, New York

DIVISION OF INDUSTRIAL ARTS AND TECHNOLOGY

This certificate is awarded to

____

in recognition of active participation in the Directed Field Study in Industry. The time, effort, and facilities used in assisting in the education of future industrial arts teachers are greatly appreciated and sincere gratitude is extended to all who worked so diligently to make the program a success.

1861

____
Dean

____
Division Director

____
Chairman, Department
Field Services

____
Date

EVALUATION OF DIRECTED FIELD STUDY

EXPERIENCE WITH COMPANY

This company which has been participating in the Directed Field Study Program is most interested in your reactions to the experiences which have been provided you while assigned here. We are interested in your reactions, suggestions, or criticisms in order that we may improve our operation in working with this program in the future.

Please provide brief statements to indicate your reactions to the various phases of your experiences in the company and, if appropriate, indicate how it might have been improved.

1. Orientation to Plant and Personnel:

2. Provision for Student Work Area:

3. Scheduling of Time to Various Departments and Personnel:

IN PLANT

1st Week - Industrial Relations:

2nd Week - Engineering:

3rd Week - Production-Manufacturing:

EVALUATION (Continued)

4th Week - Production-Labor:

5th Week - Financial Control:

6th Week - Marketing:

OVER-ALL EXPERIENCE:

(Confirmation Speaker)

STATE UNIVERSITY COLLEGE
Oswego, New York

Dear

I would like to take this opportunity to thank you for your acceptance of our invitation to speak to the Directed Field Study students on the topic, "   ".

Attached is a "Speaker Information Sheet" which we hope will give you the necessary information you will need. The section entitled, "Points Considered Important", is presented as suggestive only and is not designed to limit your presentation. Please feel free to present any other information you consider important to the overall topic.

You are scheduled to speak to the seminar group at 9:30 on ____________ ____________________. The seminar will be held at ____________________________ ____________________________.

I would like you to complete the enclosed form to provide certain background information about yourself. I would like to have this information for the purpose of introducing you to the group.

Your cooperation in providing this information on the attached form for our use will be most appreciated.

Thank you for your cooperation.

Sincerely,

Return To: Coordinator
Directed Field Study
Institution

SPEAKER BACKGROUND INFORMATION

I. Name ______________________________

II. Company ______________________________

Address ______________________________

____

Phone ______________________________

How long have you been with this company? ______________

III. Official Title ______________________________

IV. Briefly describe your major duties or function at your company.

V. List degrees held and length of experience in your profession.

VI. List any community activities such as Boy Scouts, Politics, School Boards, etc., in which you have been, or are, engaged.

VII. List any other information which you think would be helpful in introducing you as a speaker.

From: SUCO, Oswego — Directed Field Study

To:

This is to advise you that I plan to visit our student in the Directed Field Study Program assigned to your company on .... (day) ....

.... (a.m.-p.m.)   .... (date)

During my visit I plan to spend time talking with our student about his experiences at this plant and his work in the program. I would also appreciate a few minutes of your time to talk with you about the work of our student.

....
Supervisor

APPENDIX B

PROGRAM SCHEDULE

DIRECTED FIELD STUDY IN INDUSTRY

WEEKLY SCHEDULE: April 3-7, 1967

WEEK NUMBER: 1

TITLE: Orientation Seminar

Monday, April 3	Tuesday, April 4	Wednesday, April 5	Thursday, April 6	Friday, April 7
9:00 Introduction to Directed Field Study Dr. Hastings Mr. Faulkner 11:00 Pre-test Mr. Hawkins 12:00 Lunch 1:00 Pre-test Mr. Hawkins 2:00 Speaker: Dr. Paul DeVore Topic: Industrial Arts & the Directed Field Study	9:00 Film: Capitalism 10:00 Speakers: Dr. VanSchaack SUCO, Dept. of Psychology Topic: Industrial Psychology 11:30 Film: Nations Resources 12:00 Lunch 1:00 Speaker: Dr. Roger McLaughlin SUCO Topic: Industrial Sociology 3:00 Films: What Is A Corp. How the Market Evolved or The Role of the Market	9:00 Speaker: Mr. Berger SUCO Topic: Industrial Economics & Forms of Ownership 11:00 Films: Internal Organization 12:00 Lunch 1:00 Library and research work by individuals.	9:00 Speaker: Mr. Kuntz SUCO Topic: History of Industry 10:30 Speaker: Mr. Faulkner Topic: History of Labor 12:00 Lunch 1:00 Speaker: Mr. Hawkins Topic: Organization & Structure of American Industry 2:30 Films: Man on the Assembly Line and Beginning and Growth of Ind. America	9:00 Speaker Dr. Hastings Topic: Concepts - A Basis for Curriculum Development 10:30 Speaker: Mr. Faulkner Topic: Current Issues Facing Industry and Preparation for Participation 12:00 Lunch 1:00 Individual library and research assignments.

DIRECTED FIELD STUDY IN INDUSTRY

WEEKLY SCHEDULE: April 10-14, 1967

WEEK NUMBER: 2

TITLE: Industrial Relations

Monday, April 10	Tuesday, April 11	Wednesday, April 12	Thursday, April 13	Friday, April 14
Host Industry: Carrier Air Cond.Co. Carrier Parkway Syracuse, N.Y. Tel: 463-8411 9:00 Arrive Use Gate #5, Proceed to Bldg.TR-18 (as a group), Conf. Room B. 9:30 Speaker: Mr. Earl M. Hurd Dir. Ind. Relations Rockwell Mfg. Co. Syracuse, N. Y. Topic: Industrial Relations 11:00 Films: More Than Words Grievance Hearing 12:00 Lunch 12:45 Plant tour Return to Conf.room for Carrier film (20 min.) after plant tour.	STUDENTS ASSIGNED TO INDIVIDUAL INDUSTRIES FOR OBSERVATION	SUPERVISION VISIT TO: Alcan Aluminum Co. Armstrong Cork Co.		Summary Seminar at: State Office Bldg. Room 219 333 E.Washington St. Syracuse, N.Y. Tel: GR4-5951 Ext. 393 9:00 Arrive Group work on Matrix 10:45 Seminar 12:00 Lunch 1:00 Seminar

DIRECTED FIELD STUDY IN INDUSTRY

WEEKLY SCHEDULE: April 17-21, 1967

WEEK NUMBER: 3

TITLE: Engineering

Monday, April 17	Tuesday, April 18	Wednesday, April 19	Thursday, April 20	Friday, April 21
Host Industry: Crouse-Hinds Co. Wolf & 7th N. St. Syracuse, N.Y. Mrs. Van Dusen Tel: GR4-8411 9:00 Arrive at main entrance on 7th North road. 9:30 Speaker: Mr. John Madsen Process Engineer Pass & Seymour, Inc. Syracuse, N.Y. Topic: Engineering 11:30 Film: Product Development	STUDENTS ASSIGNED TO INDIVIDUAL INDUSTRIES FOR OBSERVATION	SUPERVISION VISIT TO: Ternstedt Div. G.M. Western Electric		Summary Seminar at: State Office Bldg. Room 221 333 E.Washington St. Syracuse, N.Y. Tel: GR4-5951 Ext. 393 9:00 Arrive Group work on Matrix 10:30 Film: Technological Development 11:00 Speaker: Mr. James Clark Sales Representative I B M 1000 James St. Syracuse, N.Y. Topic: Data Processing in Industry 12:00 Lunch 1:00 Seminar
12:00 Lunch				
12:40 Plant tour				

DIRECTED FIELD STUDY IN INDUSTRY

WEEK NUMBER: 4

WEEKLY SCHEDULE: April 24-28, 1967

TITLE: Production

Monday, April 24	Tuesday, April 25	Wednesday, April 26	Thursday, April 27	Friday, April 28
Host Industry: Crucible Steel Co. of America Route 690 Syracuse, N.Y. Tel: HO8-2571 9:00 Arrive at north side Conf. room. (North Shipping Gate) 9:30 Speaker: Mr. William Sorn Manager of Production Lipe Rollway Corp. Syracuse, N.Y. Topic: Production in Industry 11:55 Lunch 1:00 Plant tour 3:00 Films: Production Control Part I and II	STUDENTS ASSIGNED TO INDIVIDUAL INDUSTRIES FOR OBSERVATION	SUPERVISION VISITS TO: Prestolite Crouse-Hinds		Summary Seminar at: State Office Bldg. Room 221 333 E.Washington St. Syracuse, N.Y. Tel: GR4-5951 Ext. 393 9:00 Arrive Group work on Matrix 10:15 Films: Quality Control Motion Study Principles 10:45 Seminar 12:00 Lunch 1:00 Seminar

DIRECTED FIELD STUDY IN INDUSTRY

WEEKLY SCHEDULE: May 1-5, 1967

WEEK NUMBER: 5

TITLE: Labor

Monday, May 1	Tuesday, May 2	Wednesday, May 3	Thursday, May 4	Friday, May 5
Host Industry: General Electric Electronics Park Syracuse, N.Y. Mr. Holzworth Tel: 456-2959 9:00 Arrive 9:30 Speaker: Mr. Robert Hill Carrier Corp. Syracuse, N.Y. Topic: Labor in Industry 11:00 Film: Shop Steward 12:00 Lunch 1:00 Plant tour	STUDENTS ASSIGNED TO INDIVIDUAL INDUSTRIES FOR OBSERVATION	SUPERVISION VISIT TO: Syroco Crucible Steel Co.	LABOR SEMINAR: 9:00 Arrive at State Office Bldg., Room 221 9:30 Panel Discussion with labor leaders 12:00 Lunch 1:00 Film: Grievance Arbitration in Action 2:00 Discussion of Arbitration with Mr. Jerome Winterhalt, Field Representative, I.B.E.W.	Summary Seminar at: State Office Bldg. Room 221 Syracuse, N.Y. Tel: GR4-5951 Ext. 393 9:00 Arrive Group work on Matrix 10:45 Seminar 12:00 Lunch 1:00 Seminar

DIRECTED FIELD STUDY IN INDUSTRY

WEEKLY SCHEDULE: May 8-12, 1967

WEEK NUMBER: 6

TITLE: Financial Control

Monday, May 8	Tuesday, May 9	Wednesday, May 10	Thursday, May 11	Friday, May 12
Host Industry: Rollway Bearing 7600 Morgan Road Liverpool, N.Y. Mr. Earl Smith Tel: 652-2561 9:00 Arrive 9:30 Speaker: Mr. Richard Orsini Asst. Comptroller Crouse-Hinds Co. Syracuse, N.Y. Topic: Financial Management 12:15 Lunch 1:15 Plant tour	STUDENTS ASSIGNED TO INDIVIDUAL INDUSTRIES FOR OBSERVATION	SUPERVISION VISIT TO: General Electric R. E. Dietz Co.		Summary Seminar at: State Office Bldg. Room 221 Syracuse, N.Y. Tel: GR4-5951 Ext. 393 9:00 Arrive 9:15 Speaker: Mr. David J. Joor Investment Advisor Hayden Stone, Inc. 210 S.Warren St. Syracuse, N.Y. Topic: Investments and Securities 10:30 Group work on Matrix 12:00 Lunch 1:00 Seminar

DIRECTED FIELD STUDY IN INDUSTRY

WEEKLY SCHEDULE: May 15-19, 1967

WEEK NUMBER: 7

TITLE: Marketing

Monday, May 15	Tuesday, May 16	Wednesday, May 17	Thursday, May 18	Friday, May 19
Host Industry: Ternstedt Division General Motors Town Line Rd. Syracuse, N.Y. Tel: HO3-6261 9:00 Arrive at Administration Bldg. 9:30 Speaker: Mr. D.W.Carpenter Div. of Marketing Syracuse China Syracuse, N.Y. Topic: Marketing 11:30 Film: Production and Marketing 12:15 Lunch 1:15 Plant tour	STUDENTS ASSIGNED TO INDIVIDUAL INDUSTRIES FOR OBSERVATION	SUPERVISION VISIT TO: Estabrook Printing Vega Industries		Summary Seminar at: State Office Bldg. Room 221 Syracuse, N.Y. Tel: GR4-5951 Ext. 393 9:00 Arrive Work on Matrix 10:30 Seminar 12:00 Lunch 1:00 Seminar 2:30 Speaker: Mr. Milton Beebe Conklin, Labs & Beebe Advertising Agency Gen. Motors Circle Syracuse, N.Y. Topic: The Role of an Advertising Agency

DIRECTED FIELD STUDY IN INDUSTRY

WEEKLY SCHEDULE: May 22-26, 1967

WEEK NUMBER: 8

TITLE: Culminating Seminars and Curriculum Development

Monday, May 22	Tuesday, May 23	Wednesday, May 24	Thursday, May 25	Friday, May 26
9:00 Curriculum Organization and Development Dr. Hastings 10:30 Organization of Resource Units & Committee Selection Mr. Faulkner 1:00 Developing Curriculum Format Mr. Faulkner	9:00 Resource Units Organization & Development Work session to follow Public Industrial Arts Teachers - Techniques for Interpreting Industry in School Shop	9:00 Same	9:00 Same	9:00 Same

NOTE: All seminar and work sessions will be held in Room 303 Park Hall and other adjacent rooms, except for necessary library research, from 9:00 AM to 3:30 PM each day unless otherwise noted. Lunch will be from 12:00 noon to 1:00 PM.

DIRECTED FIELD STUDY IN INDUSTRY

WEEKLY SCHEDULE: May 29 - June 2, 1967

WEEK NUMBER: 9

TITLE: Culminating Seminars and Curriculum Development

Monday, May 29	Tuesday, May 30	Wednesday, May 31	Thursday, June 1	Friday, June 2
9:00 GENERAL MEETINGS FOR NOTICES AND QUESTIONS. WORK SESSIONS TO FOLLOW.	9:00 NOTE: Committee work to be completed, assembled, and submitted for evaluation by 3:00 PM May 30.	9:00 Presentation of Units by Committees. (Approx. 45 min. for each committee) 12:00 Lunch 1:00 Presentations continued	9:00 Presentations continued 12:00 Lunch 1:00 Evaluation. Post-tests Mr. Hawkins	9:00 Evaluation and discussion of student evaluation of program.
		NOTE: All seminar and work sessions will be held in Room 303 Park Hall and other adjacent rooms, except for necessary library research, from 9:00 AM to 3:30 PM each day unless otherwise noted. Lunch will be from 12:00 roon to 1:00 PM.		

APPENDIX C

SEMINAR RESOURCE UNITS

Code Symbols Used:

(1:25)	Reference and page number of item in reference
A	Transparency
#1	Example
(Quote #)	Refers to supporting quotation at end of unit

SEMINAR RESOURCE UNIT INDEX

These resource units form a major part of the guide to the college instructor who will be conducting the program and constitute the core of the instructional content to be covered by the college instructor and others. Resource personnel may be utilized to provide coverage of some of the more specialized topics.

Resource Unit | Title | Page

Guest Speaker Outlines . . . . C- 2

SECTION I - Orientation Seminars - Week 1

No. 1 Orientation to Field Study . . . . C- 13
2 Industrial Arts and The Directed Field Study . . . . . C- 21
3 Industrial Psychology . . . . C- 39
4 Industrial Sociology . . . . C- 43
5 Industrial Economics . . . . C- 54
6 Forms of Business Ownership . . . . C- 66
7 Current Issues Facing American Industry . . . . . . C- 78
8 History of American Industry . . . . C- 93
9 History of American Labor . . . . C- 97
10 Organization and Structure of American Industry . . . C-104
11 Concepts - Basis for Curriculum Development C-125

SECTION II - Observation in Industry Seminars - Weeks 2 - 7

12 Industrial Relations C-145
13 Engineering C-168
14 Production C-192
15 Labor C-224
16 Finance C-237
17 Marketing C-263

SECTION III - Curriculum Construction Workshop - Weeks 8 - 9

18 Curriculum Construction Part I C-282
19 Curriculum Construction Part II C-299
20 Review and Evaluation of Resource Units C-315
21 Student Evaluation of Field Study Program C-316

GUEST SPEAKER OUTLINES

Outside resource speakers from business, industry and other disciplines are extremely valuable for adding depth and perspective on many subjects. These speakers are particularly appropriate in the Monday orientation seminars held each week.

The following brief outlines are designed for use by guest speakers to guide them in their preparation of seminar presentations. The outlines are necessarily brief and cover each subject area generally, thus allowing the speaker the latitude to develop his presentation according to his own background and experience. More extensive outlines on most of these subjects are to be found in the seminar units following these outlines in this appendix. The program coordinator may wish to make the seminar unit outline available to the guest speaker for review, if the speaker desires to have a more extensive outline to refer to in preparing his presentation.

These brief outlines are presented here in the same sequence as the seminar outlines and, generally, in the order in which they would be used in the operation of the program.

FIELD STUDY - SPEAKER INFORMATION SHEET

Topic: An Introduction to Industrial Relations

Group: The group to which you have been asked to speak is composed of approximately eighteen students and faculty members from the Division of Industrial Arts and Technology of the State University College at Oswego. These individuals are involved in the Directed Field Study in Industry program which is designed to give the students a first hand knowledge of the organization and operation of industry.

Your topic is intended to give these students a better understanding of the role and functions of the industrial relations department as it is practiced today. This presentation will provide an introduction to this important industrial management area which will be studied by the group during this entire week.

Suggested Points to Cover:

A. What is the place of the industrial relations department with respect to the total management organization of a company?

B. Role and functions of the Industrial Relations Department
  1. Employment
     a. Recruitment
     b. Standards
     c. Interview techniques
     d. Testing
     e. Induction procedures
     f. Labor surveys
  2. Salary and wage administration
     a. Kinds of employee classification (hourly, incentive, salary, exempted)
     b. Evaluation
     c. Factors determining salaries and wages
  3. Employee welfare programs
     a. Retirement
     b. Health and Accident insurance
     c. Recreation
     d. Personal leave
     e. Vacations
     f. Stock purchase plan
     g. Others
  4. Labor relations
     a. Contract negotiations (collective bargaining)
     b. Grievances - what they are and procedure of handling
     c. Implementing the contract
     d. Others
  5. Communications
     a. Communications with employees, management and community
     b. Need for effective communications
     c. Types of media used
  6. Safety program
     a. Importance of a safety program
     b. What programs are operated

FIELD STUDY - SPEAKER INFORMATION SHEET

Topic: Engineering in Industry

Group: The group to which you have been asked to speak is composed of approximately eighteen students and faculty members from the Division of Industrial Arts and Technology of the State University College at Oswego. These individuals are involved in the Directed Field Study in Industry program which is designed to give the students a first hand knowledge of the organization and operation of industry.

Your topic is intended to provide these students with a broad overview of the various types of industrial engineering and its place and importance in a modern industry.

Suggested Points to Cover:

A. Introduction
    1. Types of engineering
        a. Research and Development
        b. Plant engineering
        c. Product engineering
        d. Process engineering

    2. Relationship of various types
    3. Security during engineering

B. Research and Development
    1. What is the role of the department?
    2. How does the department function?
    3. Where do research and development ideas come from?

C. Product engineering
    1. What is the function of product engineering?
    2. What type of people work on product engineering?
        a. Designers
        b. Engineers
        c. Etc.

D. Manufacturing engineering (Process engineering)
    1. What is the function of process engineering?

E. Plant engineering
    1. What is the function of this department?
    2. How is maintenance controlled?
    3. What are the types of maintenance performed?

FIELD STUDY - SPEAKER INFORMATION SHEET

Topic: **An Introduction to Production**

Group: The group to which you have been asked to speak is composed of approximately eighteen students and faculty members from the Division of Industrial Arts and Technology of the State University College at Oswego. These individuals are involved in the Directed Field Study in Industry program which is designed to give the students a first hand knowledge of the organization and operation of industry.

Your topic is intended to give these students a better understanding of management, organization and operational functions of the production department of a typical manufacturing company.

Suggested Points to Cover:

A. Explain the concept of "Production System"
   1. Phases required from order receipt to finished product
   2. Time requirements

B. Explain the relationship between Research-Development-Production

C. Explain the relationship and communication carried on between design engineering and process engineering

D. Explain the functions of:
   1. Methods engineering (MTM)
   2. Tool engineering
   3. Quality control (inspection)
   4. Scheduling
   5. Production control
   6. Critical path method
   7. Routing
   8. Value analysis

E. If possible, provide an example of a product in the various stages of production. Include examples of Production Processing "paper work" such as:
   1. Sales schedule
   2. Sales parts schedule
   3. Piece part and/or assembly drawings
   4. Parts lists
   5. Parts manufacturing scheduling
   6. Rates schedule
   7. Factory order
   8. Purchase (ordering) sheet
   9. Purchase requisition

FIELD STUDY - SPEAKER INFORMATION SHEET

Topic: Introduction to the Role of the Worker in Production

Group: The group to which you have been asked to speak is composed of approximately eighteen students and faculty members from the Division of Industrial Arts and Technology of the State University College at Oswego. These individuals are involved in the Directed Field Study in Industry program which is designed to give the students a first hand knowledge of the organization and operation of industry.

Your topic is intended to give these students a better understanding of the role of the worker in production and some of the factors which can and do affect his employment.

Suggested Points to Cover:

A. Introduction
  1. Types of work
    a. Production
    b. Other

B. Determining labor needed
  1. Production schedule
  2. Skill mix
    a. Job evaluation for new skills
    b. Requisition for new employee

C. Hiring new employees
  1. Select competent applicant
    a. Check out references
  2. Seniority
    a. Job transfer request
    b. Post and bid procedure

D. Employee training
  1. Tuition refund programs
  2. Apprentice programs
  3. MDTA
  4. Company run school and courses

E. Compensation
  1. Incentive
  2. Supplemental benefits
    a. For retention of workers

F. Communications between company and worker
  1. Unions
    a. Grievance procedure
    b. Types of shops
  2. Suggestion plans
  3. Other

FIELD STUDY - SPEAKER INFORMATION SHEET

Topic: An Introduction to Labor Organizations (Panel Discussion) *

Group: The group to which you have been asked to speak is composed of approximately eighteen students and faculty members from the Division of Industrial Arts and Technology of the State University College at Oswego. These individuals are involved in the Directed Field Study in Industry program which is designed to give the students a first hand knowledge of the organization and operation of industry.

The objective of this panel presentation is to provide these students with a better understanding of the organization, structure, functions and problems facing organized labor today.

Suggested Points to Cover:

A. What is the structure of the AFL-CIO?

B. What is the function of a business agent or local president?

C. How does a company become organized?

D. What is the difference between a trade union and an industrial union?

E. Apprenticeship program in the trade unions.

F. What are some of the problems facing unions today?

G. What is the future of unions in the United States?

* Other personnel who will possibly participate in this panel discussion may include representatives of:

1. A local trade union
2. A local craft union
3. A union business agent
4. A local labor council
5. A state or federal mediator.

FIELD STUDY - SPEAKER INFORMATION SHEET

Topic: Financial Control

Group: The group to which you have been asked to speak is composed of approximately eighteen students and faculty members from the Division of Industrial Arts and Technology of the State University College at Oswego. These individuals are involved in the Directed Field Study in Industry program which is designed to give the students a first hand knowledge of the organization and operation of industry.

Your topic is intended to provide these students with a broad understanding of the function of the comptroller and financial management in industry.

Suggested Points to Cover:

A. Importance and purpose of financial management
   1. Gather and record financial data
   2. Provide basis for management decisions

B. Financial statements
   1. Net worth
      a. Assets
      b. Liabilities
   2. Profit and Loss statements
   3. Corporate Annual Reports
      a. Information contained in report
      b. Reading an Annual Report
         (1) Assets
         (2) Liabilities
         (3) Protection rate or factor
         (4) Profit and Loss
      c. Analysis of company health from statement

C. Analysis of sales dollar breakdown

D. Financial management in a corporation
   1. Organization for management
   2. Functions within organization
      a. Comptroller
      b. Treasurer
      c. Budget
      d. Audit
   3. Methods of company growth

E. Inventory control
   1. Procedure
      a. Types of inventories

F. Cost control
   1. Importance to planning
   2. Methods

G. Purchasing
   1. Procedures
   2. Organization of purchasing

FIELD STUDY - SPEAKER INFORMATION SHEET

Topic: An Introduction to Securities

Group: The group to which you have been asked to speak is composed of approximately eighteen students and faculty members from the Division of Industrial Arts and Technology of the State University College at Oswego. These individuals are involved in the Directed Field Study in Industry program which is designed to give the students a first hand knowledge of the organization and operation of industry.

Your topic is intended to give these students a better understanding of the means of financing industrial operations and growth and the factors which can and do affect an industry's financial growth.

Suggested Points to Cover:

A. Place of capital in our economy
  1. Types of capital
    a. Loans
    b. Equity investment
    c. Advantages and risks of each

B. Types of securities used by industrial companies
  1. Common
  2. Preferred

C. Characteristics of various types of securities

D. Services and responsibilities of:
  1. Exchanges
  2. Brokerage firms

E. Understanding financial page of newspaper

F. Sources of information available to individual investor

NOTE: For your information, a list of companies participating in the Field Study is attached for your reference.

FIELD STUDY - SPEAKER INFORMATION SHEET

Topic: An Introduction to Electronic Data Processing in Industry

Group: The group to which you have been asked to speak is composed of approximately eighteen students and faculty members from the Division of Industrial Arts and Technology of the State University College at Oswego. These individuals are involved in the Directed Field Study in Industry program which is designed to give the students a first hand knowledge of the organization and operation of industry.

Your topic is one of several special presentations provided to give the students a greater understanding of a particular phase of their week's study of financial control. With the ever increasing industrial use of this versatile tool, electronic data processing, it is imperative that these students be exposed to its current and potential future use.

Suggested Points to Cover:

A. What is electronic data processing?

B. What systems and components are available in an electronic data processing system?
  1. Computers
    a. Analog
    b. Digital
  2. Input devices
    a. Punched cards
    b. Paper tape
    c. Electronic typewriters and teletypewriters
  3. Storage devices
    a. Magnetic drums
    b. Cores
    c. Electronic flip-flop circuits
  4. Output devices
    a. Control units
    b. Printers
    c. Plotters
    d. Tape
    e. Cards
    f. Cathode ray tubes (graphical display)

C. Briefly explain how these systems and components work

D. Explain some of the common industrial applications for electronic data processing
  1. Cost control and analysis
  2. Inventory control and analysis
  3. Engineering
  4. Marketing (market research, sales, distribution, etc.)
  5. Other applications

FIELD STUDY - SPEAKER INFORMATION SHEET

Topic: An Introduction to Marketing

Group: The group to which you have been asked to speak is composed of approximately eighteen students and faculty members from the Division of Industrial Arts and Technology of the State University College at Oswego. These individuals are involved in the Directed Field Study in Industry program which is designed to give the students a first hand knowledge of the organization and operation of industry.

Your topic is intended to give these students a better understanding of the function of marketing as it applies to American industry.

Suggested Points to Cover:

A. What is marketing?

B. How is the marketing function organized in a company?

C. What are the elements of a marketing program?
  1. Market
    a. Types
    b. Identification of the market
  2. Product
    a. What is it?
    b. What is its purpose?
  3. Organization of the company
    a. Who will do what to sell the product?
  4. Product distribution
    a. Methods
    b. Advantages and disadvantages of each method
  5. Advertising
    a. Purpose
    b. Selection of media
    c. Types of advertising
  6. Promotion of products
    a. Types of promotions
    b. Uses of promotions
  7. Packaging
    a. Types of packaging
    b. Function of packaging
  8. Warehousing
    a. Effects of warehouse location
    b. Types of warehousing
  9. Distribution channels
    a. Types of distributors (agents, wholesalers, representatives, etc.)
    b. Advantages and disadvantages of each
  10. Pricing
    a. Factors to be considered
    b. Types of pricing
      (1) High volume - low profit
      (2) Low volume - high profit
      (3) Others

FIELD STUDY - SPEAKER INFORMATION SHEET

Topic: An Introduction to an Advertising Agency

Group: The group to which you have been asked to speak is composed of approximately eighteen students and faculty members from the Division of Industrial Arts and Technology of the State University College at Oswego. These individuals are involved in the Directed Field Study in Industry program which is designed to give the students a first hand knowledge of the organization and operation of industry.

Your topic is one of several presentations scheduled for these students to provide them with a broader understanding of advertising as a special phase of their week's study of marketing.

Suggested Points to Cover:

A. Purpose of an advertising agency
  1. Guiding principles and philosophy

B. Types of clients served
  1. Specialized or general
  2. Industrial
  3. Political
  4. Institutional

C. Types of services provided
  1. Development of advertisements
  2. Recommendation of media
  3. Catalog development
  4. Promotional campaigns

D. Types of employees needed to provide service
  1. Designers
  2. Photographers
  3. Copy writers

E. Procedure used in developing advertising campaign
  1. Client contact objective
  2. Initial proposal
  3. Budget development
  4. Campaign

ORIENTATION TO FIELD STUDY
(Seminar Unit - 1)

I. Introduction

During the initial contact period with the students, several pertinent topics should be discussed to orient the participants to the Field Study. This outline indicates some of the major considerations to be presented. A listing of materials for distribution to participants at this meeting is provided below.

A. Overview statement
B. Program schedule
C. Bibliography
D. Student field workbook
E. Text(s)
F. Resource file
G. Participating Companies and personnel list
H. Map
I. Key definitions of industrial terminology (in student workbook)
J. Suggestion for program improvement critique form (in student workbook)

II. Orientation to Field Study (Distribute Overview statement)

A. Objectives (A)
   1. Function and organization of industry
   2. History of industry and labor development in U. S.
   3. Principles of Industrial Sociology, Industrial Psychology, and Industrial Economics
   4. Identify important industrial concepts
   5. Prepare curriculum resource units

III. Outline of Program (B)

A. Phase I, first week (orientation and background for remainder of the program)
   1. Evaluation of students (Pre-test)
   2. Introductory Seminars utilizing project staff and outside speakers
      a. Industrial Psychology
      b. Industrial Sociology
      c. Industrial Economics
      d. Organization and Structure of American Industry
      e. History of American Industry
      f. History of Labor
      g. Current Issues in Industry
      h. Forms of Business Ownership
      i. Industrial Arts - Field Study Relationship
      j. Concept Development
   3. Reading assignments and reports
   4. Films

B. Phase II, second - seventh weeks
   1. Student industry assignment for observation and study, not a work experience
      a. Use of workbook in industry
      b. Organization of topics, how and why (C)
      c. Identification of industrial concepts

   2. Monday and Friday Seminars

C. Phase III, eighth and ninth weeks
   1. Curriculum development seminars
      a. Curriculum development concepts
      b. Patterns of industrial arts curriculum organization
      c. Elements of curriculum development
      d. Course of study

   2. Development of resource unit seminar
      a. Nature of resource units
      b. Identifying areas of industry
      c. Characteristics of unit teaching
      d. Essentials of a unit
      e. Structuring of a unit

   3. Utilization of examples, notes, workbook data and other materials obtained during previous weeks
   4. Organize resource units from well developed industrial concepts observed or identified during earlier phases of this program
   5. Reproduce resource units
   6. Review and evaluation of resource units
   7. Student evaluation of program
   8. Evaluation of student progress (Post-test)

IV. Student Field Workbook

A. Two copies for each student
   1. One for rough notes and field use
   2. One for final good copy to be submitted in typed form

B. Text and supplementary reading assignments
   1. Supplementary bibliography listing
   2. Field Study library
   3. College library

C. Workbook questions
   1. Understand the "why" to the questions
   2. Answer as many as possible (It is recognized that not all questions can be answered as some may not apply to specific industries.)
   3. Gather as many examples of appropriate forms and other selective data as possible
   4. Review and Application section
      a. Occupational information
      b. Matrix
      c. Concept identification
      d. Concept presentation (suggested activities)

V. Suggestions for Program Improvement and Revision
(distribute form)

VI. Resource File

A. Discuss selected items
  1. Background materials
  2. Familiarize self with these materials for:
    a. use during observation period
    b. use during development of resource units
    c. potential use in teaching

  3. Inventory listing
  4. Sign out for these materials

VII. Weekly Seminars (Phase II) (D)

A. Monday (Provide a general orientation to the week's topic of study.)
  1. Read text for general background understanding prior to presentation
  2. Resource speaker from industry will present broad overview of topic
  3. Students should be prepared to ask pertinent questions

B. Friday (Seminar review of major points gathered during the week.)
  1. Matrix - compare two other industries
  2. Resource speakers in specialized areas:
    a. data processing
    b. securities
    c. advertising
    d. labor unions

  3. Discuss and identify industrial concepts
  4. Discuss and identify potential activities for teaching these concepts

VIII. Evaluation of Participants in Field Study

A. Punctuality and attendance at all sessions
  1. Notify college staff and/or industrial coordinator by phone in case of absence

B. Active participation in all seminar discussions
C. Quality and quantity of all written work
D. Original thinking and imagination reflected in development of application section of manual
E. Sincere and earnest effort in developing resource units during Phase III

ORIENTATION TO FIELD STUDY

INDEX TO TRANSPARENCIES

A. Operational Objectives for the Field Study Program

B. Field Study Schedule

C. Common Elements of Industry

D. Typical Week Schedule

A

OPERATIONAL OBJECTIVES FOR THE FIELD STUDY PROGRAM

1. To provide future industrial arts teachers with a broad understanding of the function and organization of the major common elements of industry for interpretation in their classes.

2. To develop a fundamental understanding of the history and development of industry and labor and of the relationship and responsibilities of labor and management in our industrial society.

3. To develop an understanding of the principles of industrial sociology, industrial psychology, and industrial economics to future industrial arts teachers.

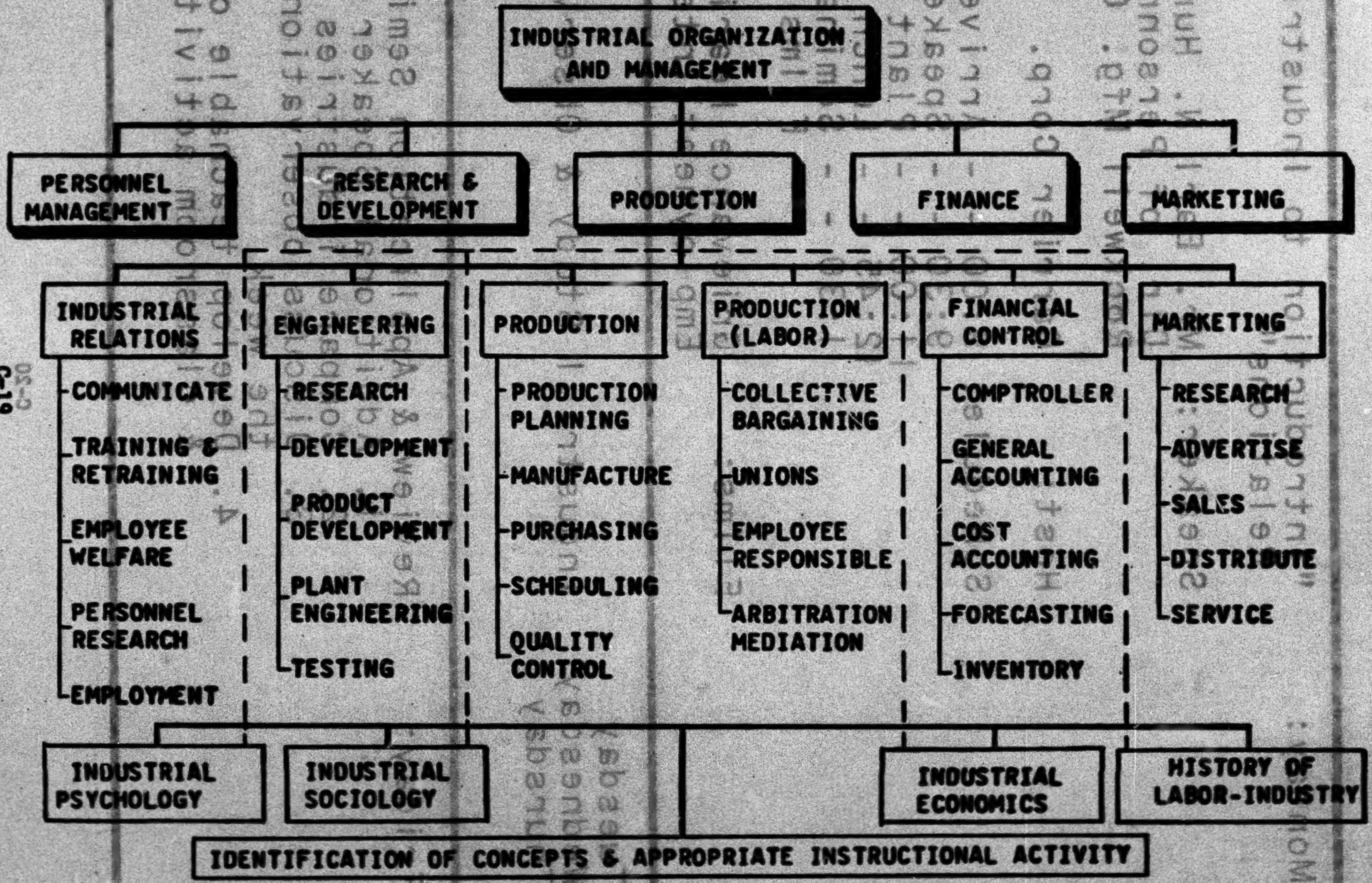
4. To give future industrial arts teachers an opportunity to identify the important concepts about American industry which need to be taught at the public school level and to prepare curriculum resources for developing these concepts with public school students.

FIELD STUDY SCHEDULE

B

Week 1	Phase I - Introductory & Background Seminars (On Campus)
	1. Ind. Psychology 2. Ind. Sociology 3. Ind. Economics 4. History of Ind & Labor 5. Org. of Ind. 6. Guide to Observation
	Phase 2 - Observation and Study in Industry
Week 2	Industrial Relations
Week 3	Engineering
Week 4	Production
Week 5	Labor Part I - In Industry Part II - Special Seminar
Week 6	Financial Control
Week 7	Marketing
	Phase III - Culminating Seminars (On Campus)
Week 8	Refinement of concepts and development of resource materials
Week 9	Presentation & discussion of selected resource materials

COMMON ELEMENTS OF INDUSTRY


INDUSTRIAL ORGANIZATION AND MANAGEMENT
PERSONNEL MANAGEMENT
RESEARCH & DEVELOPMENT
PRODUCTION
FINANCE
MARKETING
INDUSTRIAL RELATIONS
COMMUNICATE
TRAINING & RETRAINING
EMPLOYEE WELFARE
PERSONNEL RESEARCH
EMPLOYMENT
ENGINEERING
RESEARCH
DEVELOPMENT
PRODUCT DEVELOPMENT
PLANT ENGINEERING
TESTING
PRODUCTION
PRODUCTION PLANNING
MANUFACTURE
PURCHASING
SCHEDULING
QUALITY CONTROL
PRODUCTION (LABOR)
COLLECTIVE BARGAINING
UNIONS
EMPLOYEE RESPONSIBLE
ARBITRATION MEDIATION
FINANCIAL CONTROL
COMPTROLLER
GENERAL ACCOUNTING
COST ACCOUNTING
FORECASTING
INVENTORY
MARKETING
RESEARCH
ADVERTISE
SALES
DISTRIBUTE
SERVICE
INDUSTRIAL PSYCHOLOGY
INDUSTRIAL SOCIOLOGY
INDUSTRIAL ECONOMICS
HISTORY OF LABOR-INDUSTRY
IDENTIFICATION OF CONCEPTS & APPROPRIATE INSTRUCTIONAL ACTIVITY

C

Typical Week Schedule

D

Monday: "Introduction to Industrial Relations"

Speaker: Mr. Earl N. Hurd
Dir. of Personnel
Rockwell Mfg. Co.

Host: Carrier Corp.

Schedule:
9:00 - - Arrive
9:30 - - Speaker
11:00 - - Plant Tour
12:45 - - Lunch
1:30 - - Seminar & Films

Films: Grievance Hearing
Employment Interview

Tuesday
Wednesday
Thursday
Industrial Study & Observation

Friday: Review & Application Seminar

1. Additional Speaker & Film
2. Compare industries
3. Discuss observations of the week
4. Develop teachable concepts & classroom activities

INDUSTRIAL ARTS AND THE DIRECTED FIELD STUDY

(Seminar Unit - 2)

I. Introduction

In order to pursue a study of American Industry in a specialized field study program, a common background and survey of some of the more notable curriculum ideas and programs in use today is necessary. A brief survey of the traditional industrial arts objectives and programs along with discussions of the new programs in development today should provide a basis to introduce field study material into existing programs, as well as provide a background for exploring new ideas and new industrial arts program possibilities.

II. Education and the School

A. What is education (2:31) (A) (Quote #1)
  1. Process of development of individual
    a. Thinking
    b. Problem solving
    c. Adjustment to life
    d. Citizenship
    e. Participation in society

B. Industrial Arts - past, present, future
  1. Part of general education (Quote #2)
    a. Purpose - broad, general, useful for all

  2. Wilber
    a. Definition of Industrial Arts (11:2) (B)
    b. Objectives (11:42) (C)

  3. Past-present patterns of Industrial Arts organization
    a. Emphasis of skills, processes, etc. (Quote #3)
    b. Critique - Schmitt survey of state guides (Quote #4)

  4. Developing Industrial Arts curriculum patterns
    a. Stout State - American Industry Program
      (1) Broad objectives (3:23) (D) (Quote #5)
      (2) Replacement for traditional programs (3:23) (Quote #6)
      (3) Values of conceptual approach (3:23) (E)

    b. Ohio Plan - Industrial Arts Curriculum Project (IACP)
      (1) U.S. Office of Education grant for Ohio State and University of Illinois
      (2) Basis of PRAXIOLOGY (10:4) (F) (Quote #7)
      (3) Difference between Industrial Arts and Industrial Technology (G)
      (4) Concerned only with those aspects of industry which deal with changing the form of materials (Quote #8)
      (5) Chart breakdown of IACP (10:5) (H)

c. Technology - Olson and others (6:Ch.XIII)
    (1) Olson definition (I) (Quote #9)
    (2) DeVore (4:1-2) (J) (Quote #10)

C. Industrial Field Study - Oswego
  1. Not a new curriculum structure (K)
  2. Meets need to fulfill existing objectives of understanding industry in broad sense (Quote #9)
  3. Used to enrich existing programs
  4. Useful in developing new programs

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2. __________, Yearbook 14, *Approaches and Procedures in Industrial Arts*, G.S. Wall, Editor, McKnight and McKnight Publishing Co., 1965.

3. __________, Yearbook 16, *Evaluation Guidelines for Contemporary Industrial Arts Programs*, L. P. Nelson and W. T. Sargent, Editors, McKnight and McKnight Publishing Company, 1967.

4. DeVore, Paul W., *Technology An Intellectual Discipline*. Washington, D.C., The American Industrial Arts Association Bulletin #5.

5. Faulkner, Howard M., *Industrial Arts Curriculum Project, An Interim Report*. New York State Industrial Arts Association, Baldwinsville Central School Press, 1967.

6. Hostetler, Ivan, "Manual Arts, 1914 - Industrial Arts, 1964", *Industrial Arts Vocational Education*, May 1964, pp. 19 - 22.

7. Olson, Delmar, *Industrial Arts and Technology*. N.J., Prentice-Hall, 1963.

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9. __________, *Industrial Arts - An Analysis of 39 State Curriculum Guides: 1953 - 1958*. U.S. Office of Education, Washington, D.C., Government Printing Office, 1961.

10. Towers, Edward R.; Lux, Donald G., and Ray, Willis E.; *New Dimensions in Industrial Arts Curriculum Development*.

11. Wilber, Gordon O., *Industrial Arts in General Education*. Scranton International Textbook, 1948.

Quote #1

Education is a process of development leading the individual to become a thinking, problem solving, well adjusted, and contented member of society who participates as a member in general and produces or renders a needed service to the optimum of his inherited capacities.

ACIATE Yearbook 14, *Approaches and Procedures in Industrial Arts*, p. 31.

Quote #2

Industrial arts is a part of the common learning needed by all responsible citizens. It has general educational value for each individual.

Schmitt, *Improving Industrial Arts Teaching*, p. 9.

Quote #3

While they talked of interpreting industry and of keeping abreast of the technology, they persist in teaching trade skills and a smattering of disjointed related technical information. These are presented by the teacher, and the students construct projects as a means of mastery. Somehow they hope that this activity in the setting of the industrial arts shop or laboratory will result in expected educational development. [*And an interpretation of industry when it is doubtful if the teacher even understands the meaning of the terminology used in* industry.] (italics mine)

Hostetler, "Manual Arts, 1914 - Industrial Arts, 1964", *IAVE*, May 1964, p. 55.

Quote #4

What the student does in the industrial arts laboratory ought to be related to the significant technological problems, such as, mass production, improvement of product design, research and development, new machines and processes, uses for new materials, labor utilization, management, automation, safety, and communications.

Schmitt, Industrial Arts, An Analysis of 39 State Curriculum Guides, pp. 68-69.

Quote #5

1. To develop an understanding of those concepts which directly apply to industry.
2. To develop the ability to solve problems related to industry.

ACIATE Yearbook 16, Evaluation Guidelines, p. 23.

Quote #6

They go on to suggest that this program of American Industry, based on a knowledge and understanding of related concepts, should be regarded not as a modification but as a replacement of the traditional industrial arts content.

ACIATE Yearbook 16, Evaluation Guidelines, p. 23.

Quote #7

It is in the area of PRAXIOLOGICAL knowledge that industrial arts would be properly placed according to the project staff. Praxiology is defined as the theory of practice, knowledge of practice or .... "man's ways of doing, which brings about through efficient action, what is valued (or ought to be)".

Faulkner, IACP, An Interim Report, p. 4.

Quote #8

That subcategory of the economic institution which substantially changes the form of materials in response to man's wants for goods.

Faulkner, IACP, An Interim Report, p. 5.

Quote #9

It is strange that the predominant characteristic of our society is our industrialism - our capacity to produce goods in large quantities - and yet the schools do not develop a good understanding of this aspect of our society.

Schmitt, Improving Industrial Arts Teaching, p. 9.

INDUSTRIAL ARTS AND THE DIRECTED FIELD STUDY

INDEX TO TRANSPARENCIES

A. What Is Education

B. Definition of Industrial Arts

C. Objectives of Industrial Arts

D. Stout State Objectives - Curriculum Plan

E. Values of Conceptual Approach

F. Basis of PRAXIOLOGY

G. Definitions of Industrial Arts & Industrial Technology according to Industrial Arts Curriculum Project

H. Breakdown of IACP Content - Construction & Manufacturing

I. Proposed Industrial Arts Curriculum to Reflect Technology

J. Proposed Industrial Arts Curriculum to Reflect Technology

K. Breakdown of Field Study Content

WHAT IS EDUCATION

Education is a process of development leading the individual to become a thinking, problem solving, well adjusted, and contented member of society who participates as a member in general and produces or renders a needed service to the optimum of his inherited capacities.

WALL, G. S., APPROACHES AND PROCEDURES, P. 31.

B

DEFINITION OF INDUSTRIAL ARTS

"..... those phases of general education which deal with industry -- its organization, materials, occupations, processes and products -- and with the problems resulting from the industrial and technological nature of society."

WILBER, G. O., INDUSTRIAL ARTS IN GENERAL EDUCATION, P. 2.

OBJECTIVES

1. To explore industry and American industrial civilization.
2. To develop recreational and avocational activities.
3. To increase an appreciation for good craftsmanship and design.
4. To increase consumer knowledge.
5. To provide information about and experiences in the basic processes of many industries.
6. To encourage creative expression.
7. To develop desirable social relationships.
8. To develop safe working practices.
9. To develop a certain amount of skill.

WILBER, G. O., INDUSTRIAL ARTS IN GENERAL EDUCATION, P. 42.

D

AMERICAN INDUSTRIES PROJECT

STOUT STATE PLAN

BROAD OBJECTIVES

1. To develop an understanding of those concepts which directly apply to industry.
2. To develop the ability to solve problems related to industry.

ACIATE YEARBOOK 16, EVALUATION GUIDELINES, P. 23.

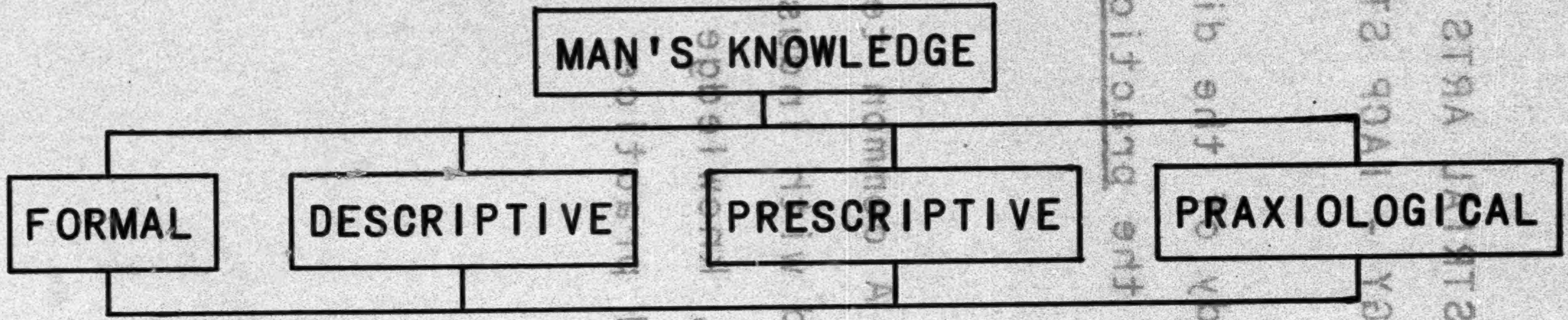
E

VALUES OF CONCEPTUAL APPROACH

1. The American Industry Study contributes to an understanding of the entire industrial situation.
2. A structure based on underlying concepts could result in a unified national curriculum and standardization of laboratory facilities.
3. Courses of study will be based on concepts which will govern the activities of the program.
4. Development of understanding the concepts will determine what facilities are needed.

ACIATE YEARBOOK 16, EVALUATION GUIDELINES, P. 23.

BASIS OF PRAXIOLOGY



MAN'S KNOWLEDGE

FORMAL

DESCRIPTIVE

PRESCRIPTIVE

PRAXIOLOGICAL

FORMAL: logic, math, linguistics

DESCRIPTIVE: sciences such as biological, physical and social

PRESCRIPTIVE: humanities and fine arts

PROXIOLOGICAL: theory of practice, knowledge of practice

TOWERS AND OTHERS, NEW DIMENSIONS IN INDUSTRIAL ARTS CURRICULUM DEVELOPMENT, P. 6.

F

G

DEFINITIONS OF INDUSTRIAL ARTS AND INDUSTRIAL TECHNOLOGY - IACP STAFF

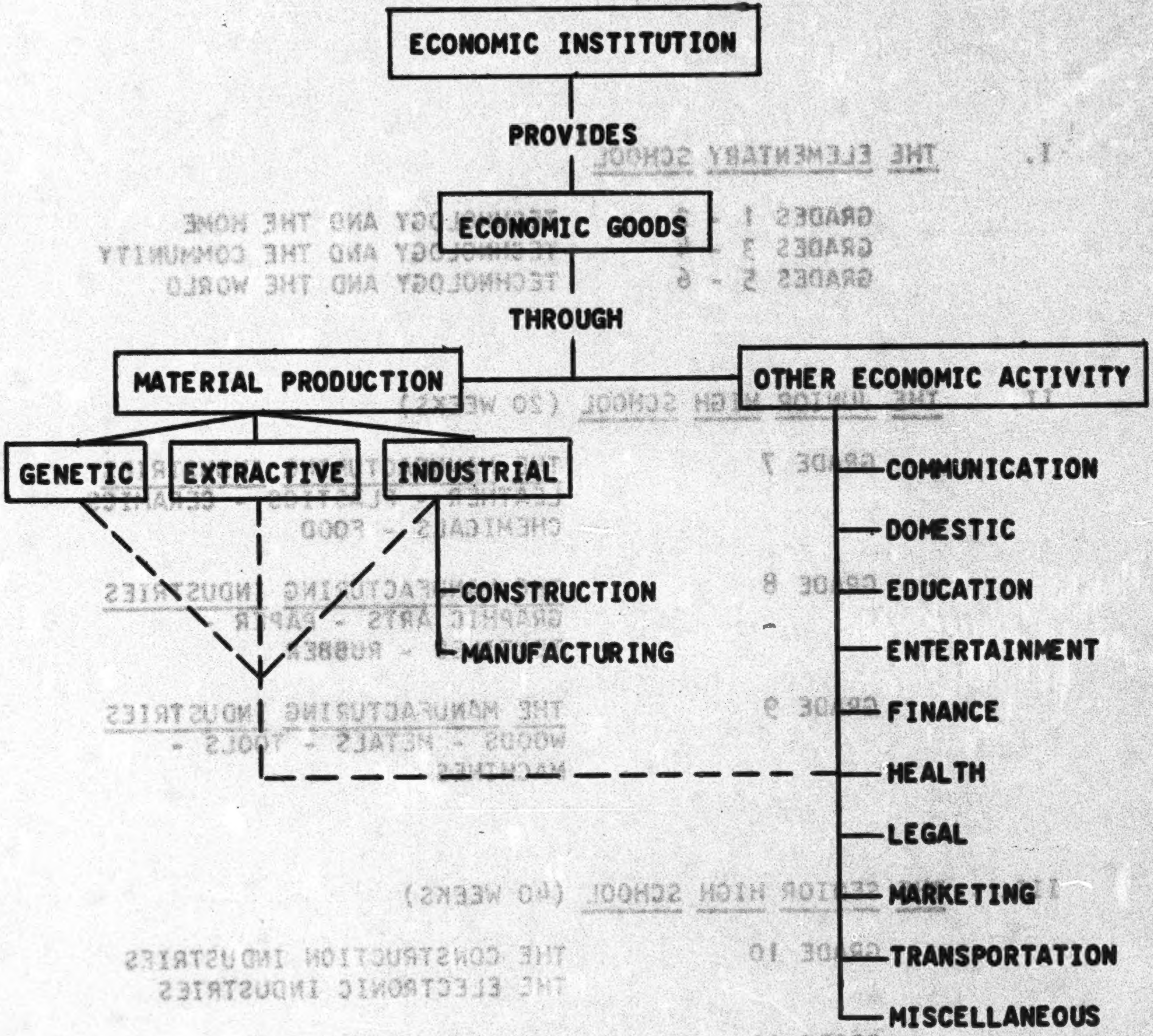
Industrial Arts: A study of the disciplined knowledge of the practices of industry.

Industrial Technology: A common term which may be equated with industrial praxiology; that is, knowledge of efficient industrial practice.

FAULKNER, IACP, INTERIM REPORT, P. 5.

BREAKDOWN OF IACP CONTENT

H


ECONOMIC INSTITUTION
PROVIDES
ECONOMIC GOODS
THROUGH
MATERIAL PRODUCTION
OTHER ECONOMIC ACTIVITY
GENETIC
EXTRACTIVE
INDUSTRIAL
CONSTRUCTION
MANUFACTURING
COMMUNICATION
DOMESTIC
EDUCATION
ENTERTAINMENT
FINANCE
HEALTH
LEGAL
MARKETING
TRANSPORTATION
MISCELLANEOUS

TOWERS AND OTHERS, NEW DIMENSIONS IN INDUSTRIAL ARTS CURRICULUM DEVELOPMENT, P. 11.

PROPOSED INDUSTRIAL ARTS CURRICULUM TO REFLECT TECHNOLOGY - OLSON

I. THE ELEMENTARY SCHOOL

GRADES 1 - 2	TECHNOLOGY AND THE HOME
GRADES 3 - 4	TECHNOLOGY AND THE COMMUNITY
GRADES 5 - 6	TECHNOLOGY AND THE WORLD

II. THE JUNIOR HIGH SCHOOL (20 WEEKS)

GRADE 7	THE MANUFACTURING INDUSTRIES LEATHER - PLASTICS - CERAMICS CHEMICALS - FOOD
GRADE 8	THE MANUFACTURING INDUSTRIES GRAPHIC ARTS - PAPER - TEXTILES - RUBBER
GRADE 9	THE MANUFACTURING INDUSTRIES WOODS - METALS - TOOLS - MACHINES

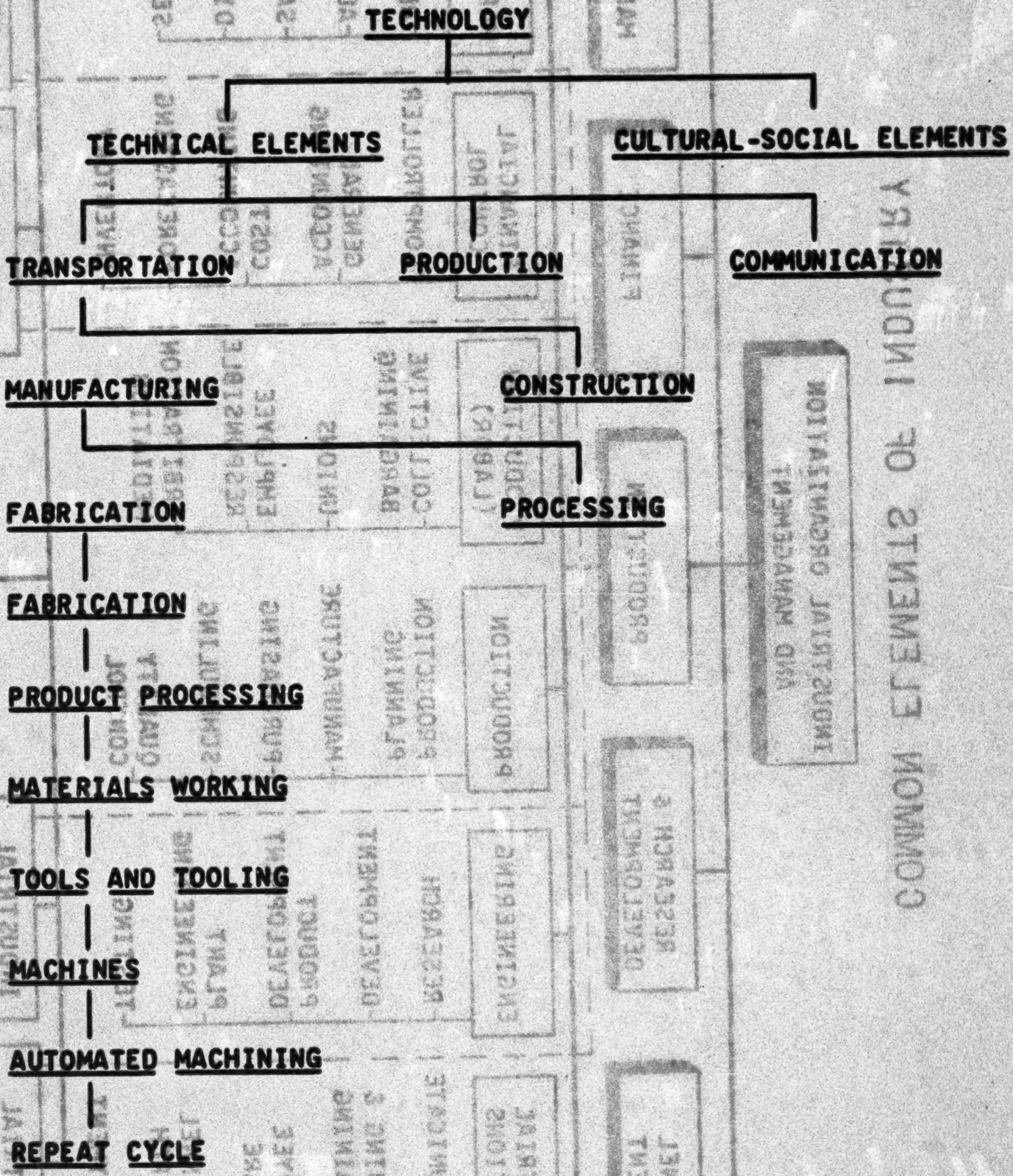
III. THE SENIOR HIGH SCHOOL (40 WEEKS)

GRADE 10	THE CONSTRUCTION INDUSTRIES THE ELECTRONIC INDUSTRIES
GRADE 11	THE POWER INDUSTRIES THE TRANSPORTATION INDUSTRIES
GRADE 12	THE SERVICES INDUSTRIES INDUSTRIAL MANAGEMENT
GRADES 10,11,12	RESEARCH AND DEVELOPMENT
GRADES 10,11,12	INDUSTRIAL ARTS RECREATION

Olson, Improving Industrial Arts Teaching, p. 26.

J

PROPOSED CURRICULUM STRUCTURE TO REFLECT TECHNOLOGY - DEVORE



TECHNOLOGY

TECHNICAL ELEMENTS

CULTURAL-SOCIAL ELEMENTS

TRANSPORTATION

PRODUCTION

COMMUNICATION

MANUFACTURING

CONSTRUCTION

FABRICATION

PROCESSING

FABRICATION

PRODUCT PROCESSING

MATERIALS WORKING

TOOLS AND TOOLING

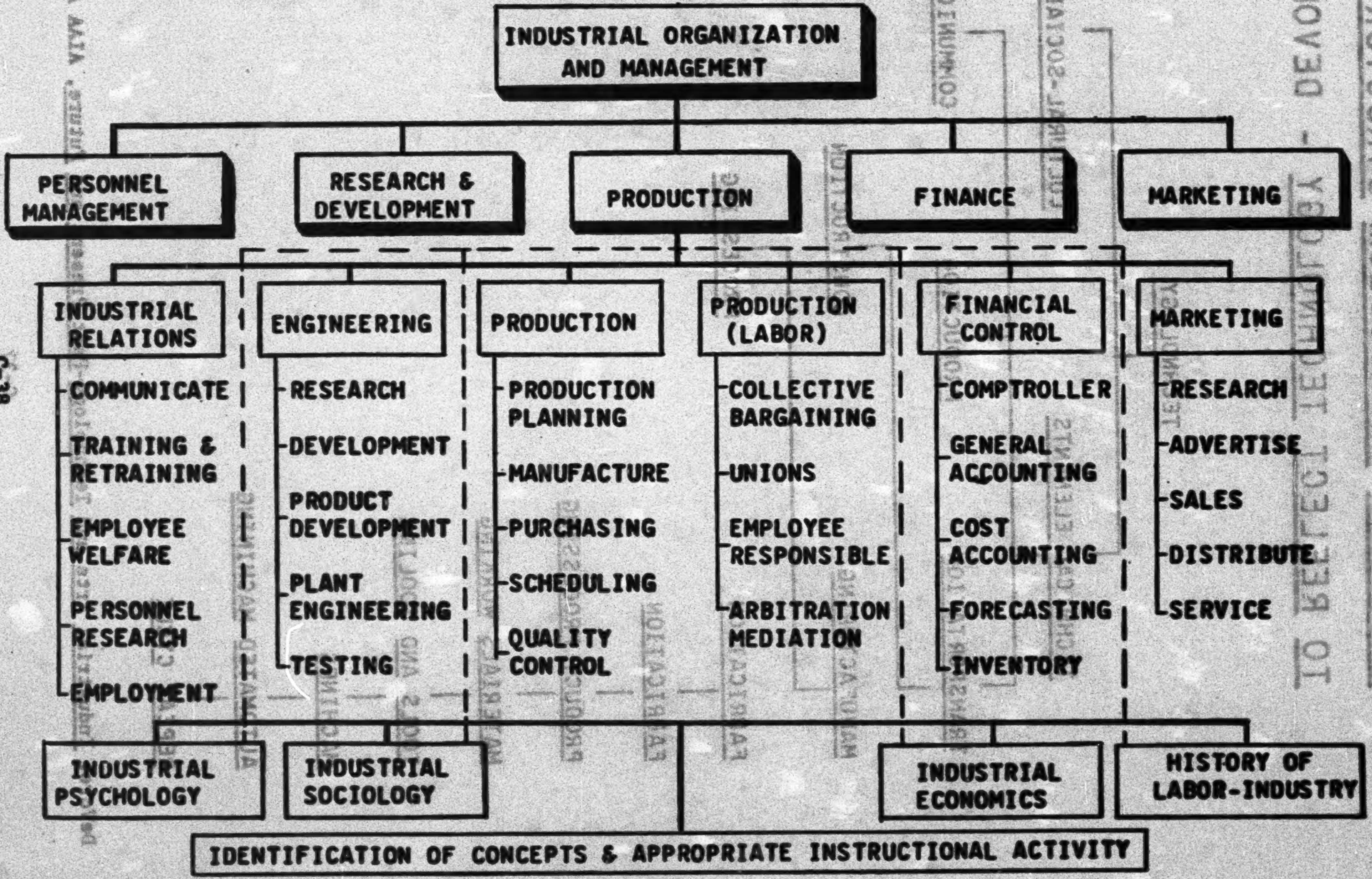
MACHINES

AUTOMATED MACHINING

REPEAT CYCLE

DeVore, Industrial Arts and Technology-Past Present and Future, AIAA Address.

COMMON ELEMENTS OF INDUSTRY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FINANCIAL CONTROL
COMPTROLLER
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COST ACCOUNTING
FORECASTING
INVENTORY
MARKETING
RESEARCH
ADVERTISE
SALES
DISTRIBUTE
SERVICE
INDUSTRIAL PSYCHOLOGY
INDUSTRIAL SOCIOLOGY
INDUSTRIAL ECONOMICS
HISTORY OF LABOR-INDUSTRY
IDENTIFICATION OF CONCEPTS & APPROPRIATE INSTRUCTIONAL ACTIVITY

K

INDUSTRIAL PSYCHOLOGY

(Seminar Unit - 3)

I. Introduction

Exposure to the basic area of Industrial Psychology for future teachers of industrial arts is very desirable. Specifically, they should be aware of the implications of psychology on industry and workers, important research, motivational considerations and the future contributions of this discipline to our industrial society.

II. Present Situation of Industry and Management

A. Man adapts to machine (Quote #1)

III. Historical Aspect of Management (1:175) (8:3)

A. Management power
B. Formation of unions (1:223)
C. Paternal organizations
D. Management, a specialty

IV. Where Does Industrial Psychology Fit In? (1:3) (4:Ch.1) (6:Ch.1)

A. What is Psychology?
  1. Scientific study of human behavior

B. Industrial Psychology
  1. Scientific study of behavior in industrial setting
  2. Adjust people to work (7:Ch.4&9) (1:458)
    a. Selection and placement
    b. Training of workers (7:Ch.10)
    c. Counseling

  3. Adjusting work to people (7:Ch.15)
    a. Light, color, heat, etc.

  4. Social aspects of industrial psychology
    a. Hawthorne study (6:Ch.8)
    b. Harwood experiment (8:397-398)

  5. Motivations of man (8:8-29) (Quote #2)
    a. Avoidance of pain
    b. Growth potential
    c. Job satisfaction (7:Ch.12) (8:99-175) (6:Ch.13) (Quote #3)
      (1) Achievement
      (2) Recognition
      (3) Work itself
      (4) Responsibility
      (5) Advancement

    d. Job dissatisfaction (3:Ch.6)
      (1) Supervision

(2) Administration
(3) Salary
(4) Working conditions
(5) Inter-personal relations

V. Future Directions for Industrial Psychology (1:353-382)

- A. Management development programs (5:190-206)
- B. Managerial team (5:227-243)

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Quote #1

Our industrial production layouts are built to utilize the production technique, the machine's characteristics, and the material's qualities to the utmost. The operator is considered the dependent variable. He is expected to (and fortunately does) bend and adjust. It is interesting to speculate on what might happen if we were to build a production line designed to maximize the human resources and motivations of the operators, and then consider the machines as dependent variables which must be built to conform to the requirements of a system designed to maximize the human's potentialities.

Haire, Psychology in Management, p. 2 - 3.

Quote #2

The expenditure of physical and mental effort in work is as natural as play or rest. The average human being does not inherently dislike work. Depending upon controllable conditions, work may be a source of satisfaction (and will be voluntarily performed) or a source of punishment (and will be avoided if possible).

McGregor, Human Side of Enterprise, p. 47.

Quote #3

The effect of improved hygiene (such as higher salaries and better working conditions) lasts only a short time. It acts like heroin--it takes more and more to produce less and less effort.

Herzberg, Work and the Nature of Man, p. 169.

INDUSTRIAL SOCIOLOGY
(Seminar Unit - 4)

I. Introduction

Exposure to the basic science of industrial sociology for industrial arts teachers is very desirable. Emphasis on the impact of industry on society and society on industry are the major topics of discussion, as well as a general understanding of the role of the industrial sociologist.

II. Sociology and Its Relationship to Psychology and Biology (A) (B) (7:16-21)

A. Sociology, analysis of Human Behavior (7:99-100)
  1. Common culture
  2. Physical proximity
  3. Identification with a particular social collective or society
  4. Recognized by others as being a society
  5. Share certain interdependent patterns of behavior in the satisfaction of needs
     a. Biogenic needs common to all men necessary for survival which include food, sleep, defication and possibly shelter and clothing
     b. Sociogenic needs are not essential for survival and vary considerably from one society to the next.
  6. Who collectively exercises control
     a. Norms or rules which guide behavior
     b. Controls to limit deviation from norms
     c. Power of reward and punishment

B. Differences in Societies and Cultures (7:170-171)
  1. Learning translated into the production of tools
  2. Creation of goods and services
  3. Control over the physical environment

C. Critical Relationships (11:Ch.3)
  1. Man will attempt to meet his needs through mediating effects of culture, including technology and tools
  2. How well culture permits man to meet his needs is an indicator of social adjustment. Some indicators are:
     a. life expectancy
     b. birth and death rates
     c. frequency for mental illness
     d. proportion of time devoted to meeting basic needs

  3. Culture and Technology (7:22) (4:1-5) (12:1-4)
     a. Indicators of industrialization
        (1) Steel production
        (2) Gross national product
        (3) Production of utilities
        (4) Production of capital goods

(5) Production of consumer goods

b. Sociology of industry (7:14-16) (9:Ch.I)

III. Transition Points Toward Industrial Society

- A. Theoretical and historical views (12:1-3,31-33) (4:26) (3:all) (C)
  - 1. Marx and Engels
  - 2. Weber, the Protestant Ethic
  - 3. Social patterns in the Feudal period Estates
  - 4. Industry and the community (7:21)

IV. Social Patterns in Industrial Societies

- A. Development of class system
  - 1. Class determinants
    - a. Prestige (esteem)
    - b. Power
    - c. Economic involvement or occupation
  - 2. Attempts to measure and define social class (7:11-12) (6:19) (4:18-20)
    - a. Middletown
    - b. W. Lloyd Warner
- B. Studies of occupations in industrial societies (6:20) (8:56-87) (D)
  - 1. Census description (1:all)
  - 2. North-Hatt Index (10:277-283) (Example #1)
- C. Social ethics and technology (7:Ch.1&2) (10:Ch.2) (11:Ch.2) (E)
  - 1. Work as social activities
  - 2. The factory as a social system
  - 3. Interpersonal relations and work situations
  - 4. Union organizations (9:11-14) (7:8-9)
    - a. Status
    - b. Political dealings
    - c. Strengths
  - 5. Social organization of management (10:2) (7:6-7) (F)
    - a. Management levels
    - b. Social orientations
    - c. Prerogatives
    - d. Structure - status

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INDUSTRIAL SOCIOLOGY - Example #1

Representative Sampling of Occupational Prestige in the United States

Occupation	Score 1947	Score 1963
U.S. Supreme Court Justice	96	94
Physician	93	93
State Governor	93	91
Cabinet member in the federal government	92	90
Diplomat in the U.S. Foreign Service	92	89
Mayor of a large city	90	86
College professor	89	90
Scientist	89	92
United States representative in Congress	89	90
Banker	88	85
County Judge	87	88
Minister	87	87
Architect	86	88
Chemist	86	89
Dentist	86	88
Lawyer	86	89
Member of board of directors of a large corporation	86	87
Nuclear physicist	86	92
Priest	86	86
Psychologist	85	87
Civil engineer	84	86
Airline pilot	83	86
Artist who paints pictures that are exhibited in galleries	83	78
Owner of a factory that employs about 100 people	82	80
Sociologist	82	83
Biologist	81	85
Author of novels	80	78
Captain in the regular army	80	82
Building contractor	79	80
Economist	79	78
Public school teacher	78	81
Railroad engineer	77	76
Farm owner and operator	76	74
Electrician	73	76
Trained machinist	73	75
Undertaker	72	74
Insurance agent	68	69
Policeman	67	72
Carpenter	65	68
Automobile repairman	63	64
Plumber	63	65
Bartender	44	48
Shoe shiner	33	34
AVERAGE	70	71

Bendix and Lipset, Class, Status and Power, pp. 324 - 325.

INDUSTRIAL SOCIOLOGY

INDEX TO TRANSPARENCIES

A. In-Plant and Extra-Plant Influences on Work Behavior

B. The Biological, Psychological, and Social Factors as Interacting Forces Affecting the Behavior of Workers

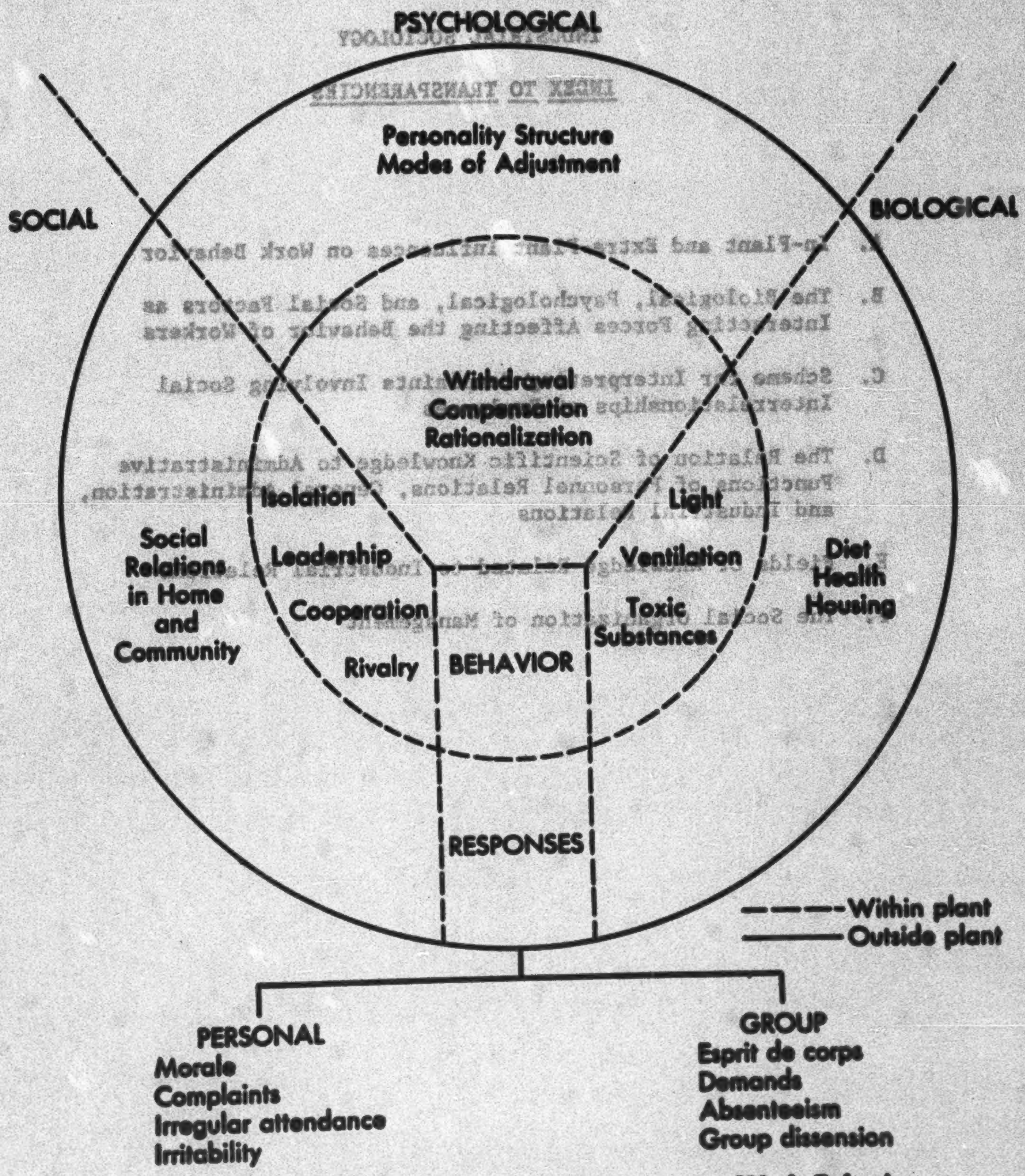
C. Scheme for Interpreting Complaints Involving Social Interrelationships of Employees

D. The Relation of Scientific Knowledge to Administrative Functions of Personnel Relations, General Administration, and Industrial Relations

E. Fields of Knowledge Related to Industrial Relations

F. The Social Organization of Management

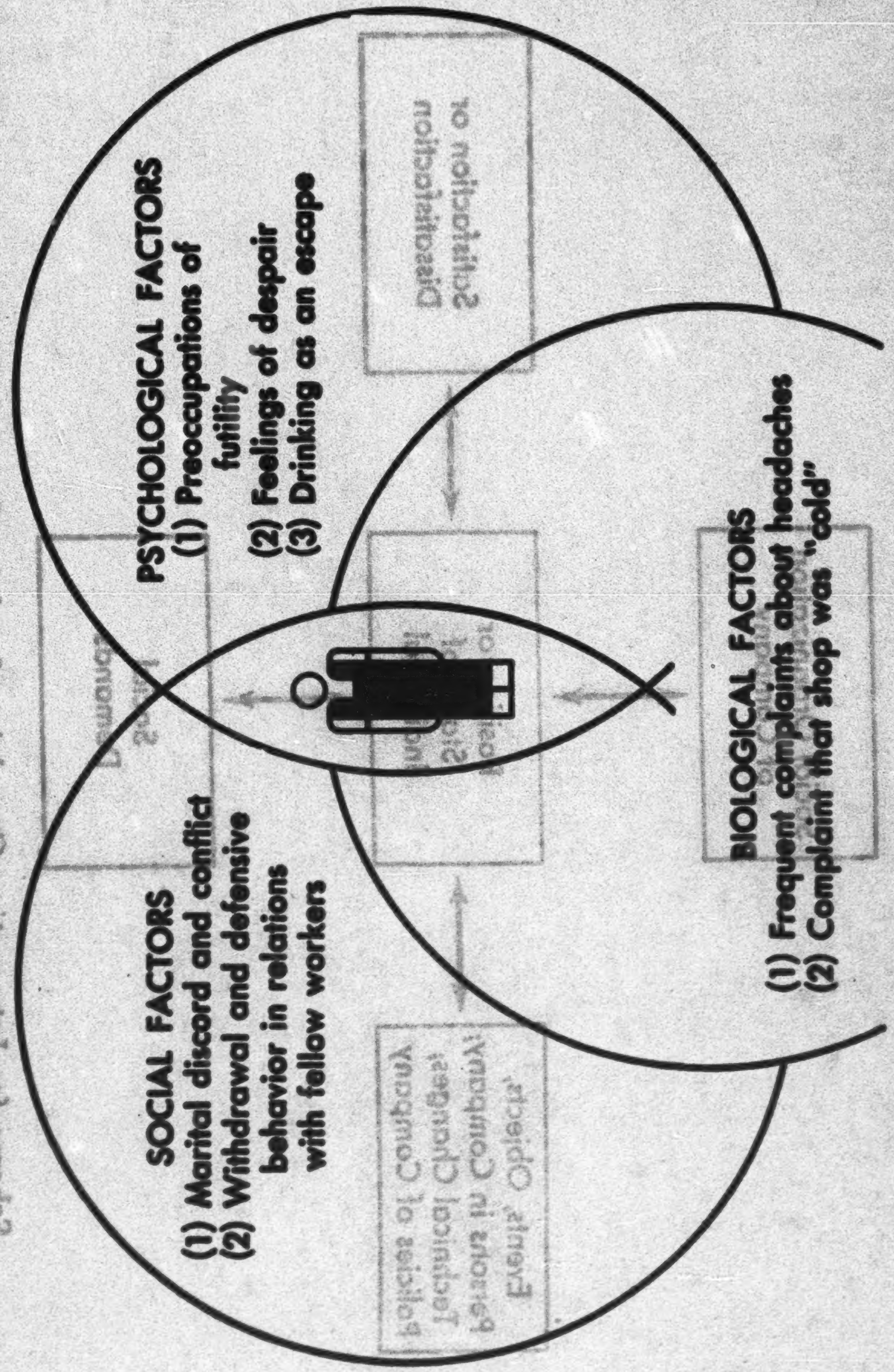
A


PSYCHOLOGICAL
Personality Structure
Modes of Adjustment
SOCIAL
BIOLOGICAL
Withdrawal
Compensation
Rationalization
Isolation
Leadership
Cooperation
Rivalry
Light
Ventilation
Toxic Substances
Social Relations in Home and Community
Diet
Health
Housing
BEHAVIOR
RESPONSES
Within plant
Outside plant
PERSONAL
Morale
Complaints
Irregular attendance
Irritability
GROUP
Esprit de corps
Demands
Absenteeism
Group dissension

In-Plant and Extra-Plant Influences on Work Behavior.

Source: Miller & Form, Industrial Sociology, p. 17

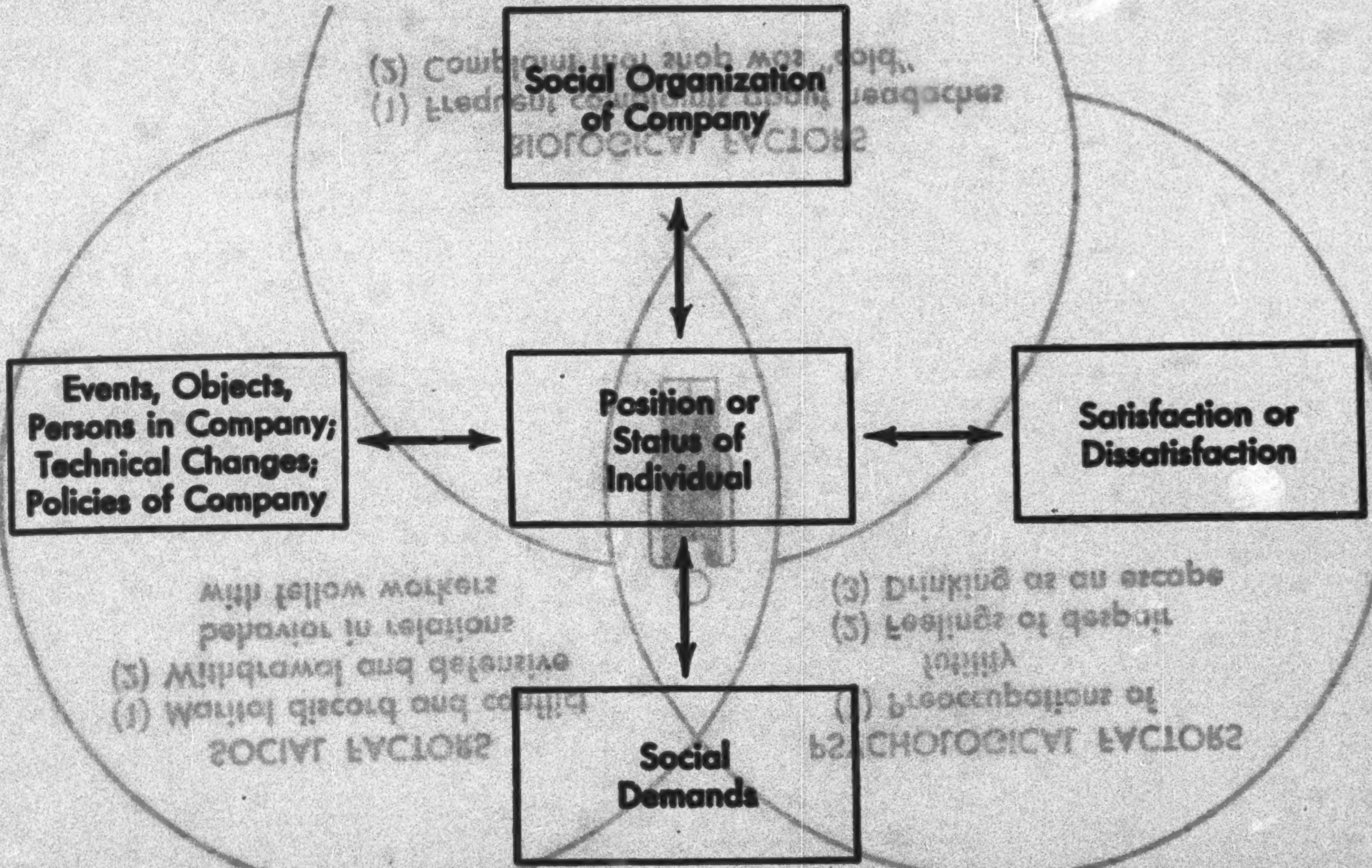
B


PSYCHOLOGICAL FACTORS
(1) Preoccupations of futility
(2) Feelings of despair
(3) Drinking as an escape
SOCIAL FACTORS
(1) Marital discord and conflict
(2) Withdrawal and defensive behavior in relations with fellow workers
BIOLOGICAL FACTORS
(1) Frequent complaints about headaches
(2) Complaint that shop was "cold"

The Biological, Psychological, and Social Factors as Interacting Forces Affecting the Behavior of Workers.

Source: Miller & Form, Industrial Sociology, p. 19

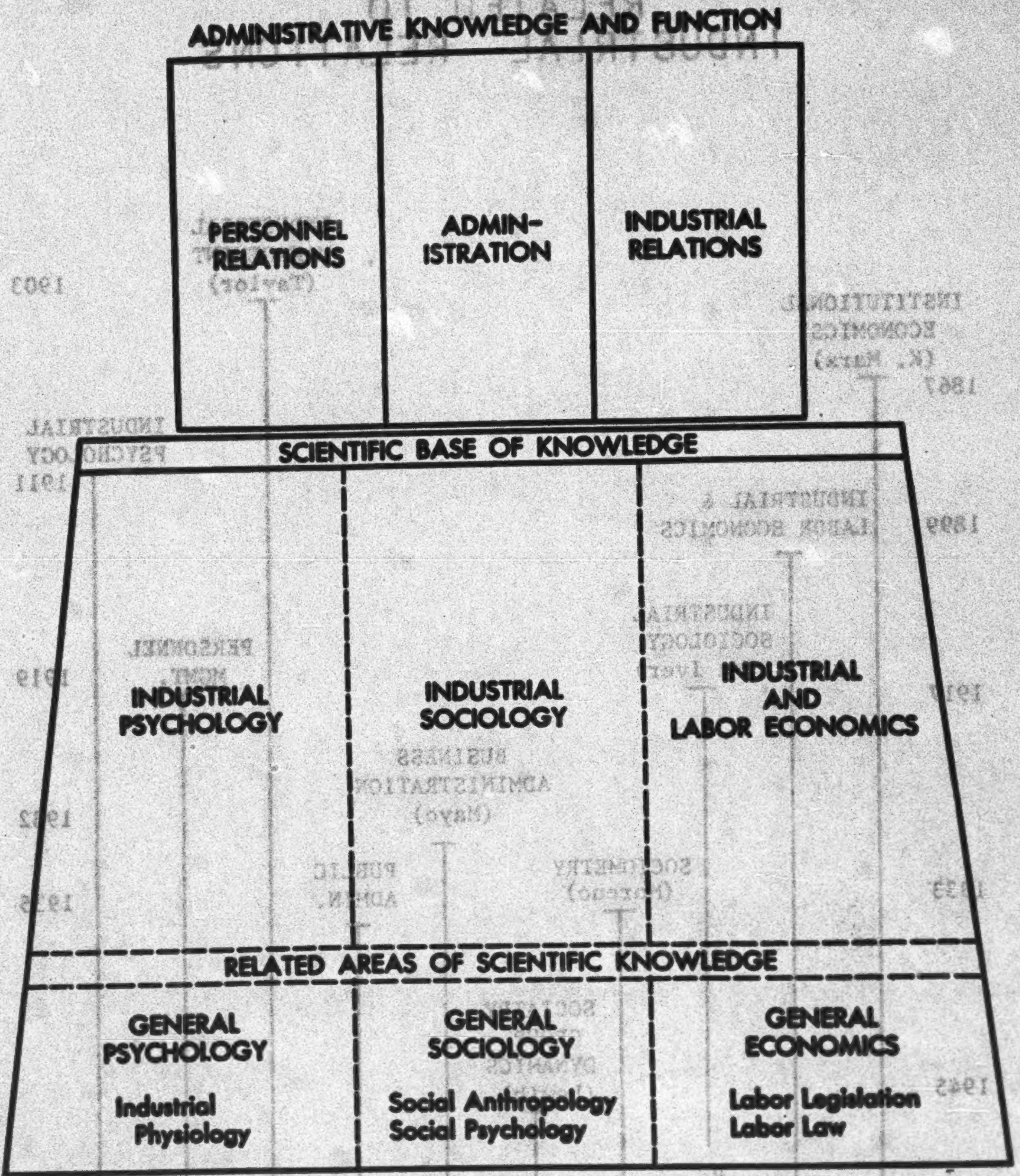
C


Social Organization of Company
Events, Objects, Persons in Company; Technical Changes; Policies of Company
Position or Status of Individual
Satisfaction or Dissatisfaction
Social Demands

Scheme for Interpreting Complaints Involving Social Interrelationships of Employees.

Source: Miller & Form, Industrial Sociology, P. 55

D

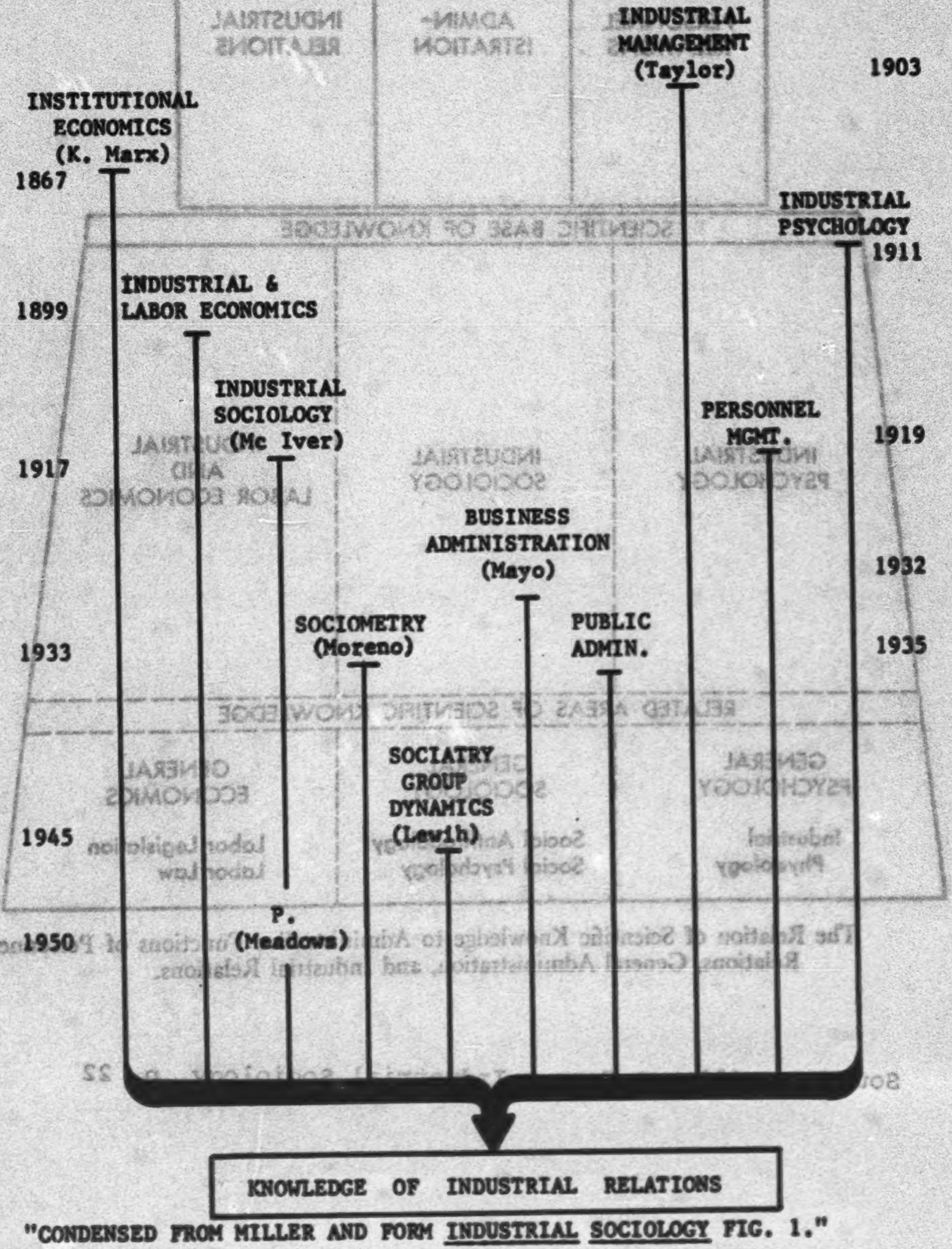

ADMINISTRATIVE KNOWLEDGE AND FUNCTION
PERSONNEL RELATIONS
ADMINISTRATION
INDUSTRIAL RELATIONS
SCIENTIFIC BASE OF KNOWLEDGE
INDUSTRIAL PSYCHOLOGY
INDUSTRIAL SOCIOLOGY
INDUSTRIAL AND LABOR ECONOMICS
RELATED AREAS OF SCIENTIFIC KNOWLEDGE
GENERAL PSYCHOLOGY
Industrial Physiology
GENERAL SOCIOLOGY
Social Anthropology
Social Psychology
GENERAL ECONOMICS
Labor Legislation
Labor Law

The Relation of Scientific Knowledge to Administrative Functions of Personnel Relations, General Administration, and Industrial Relations.

Source: Miller & Form, Industrial Sociology, P. 22

E

FIELDS OF KNOWLEDGE RELATED TO INDUSTRIAL RELATIONS

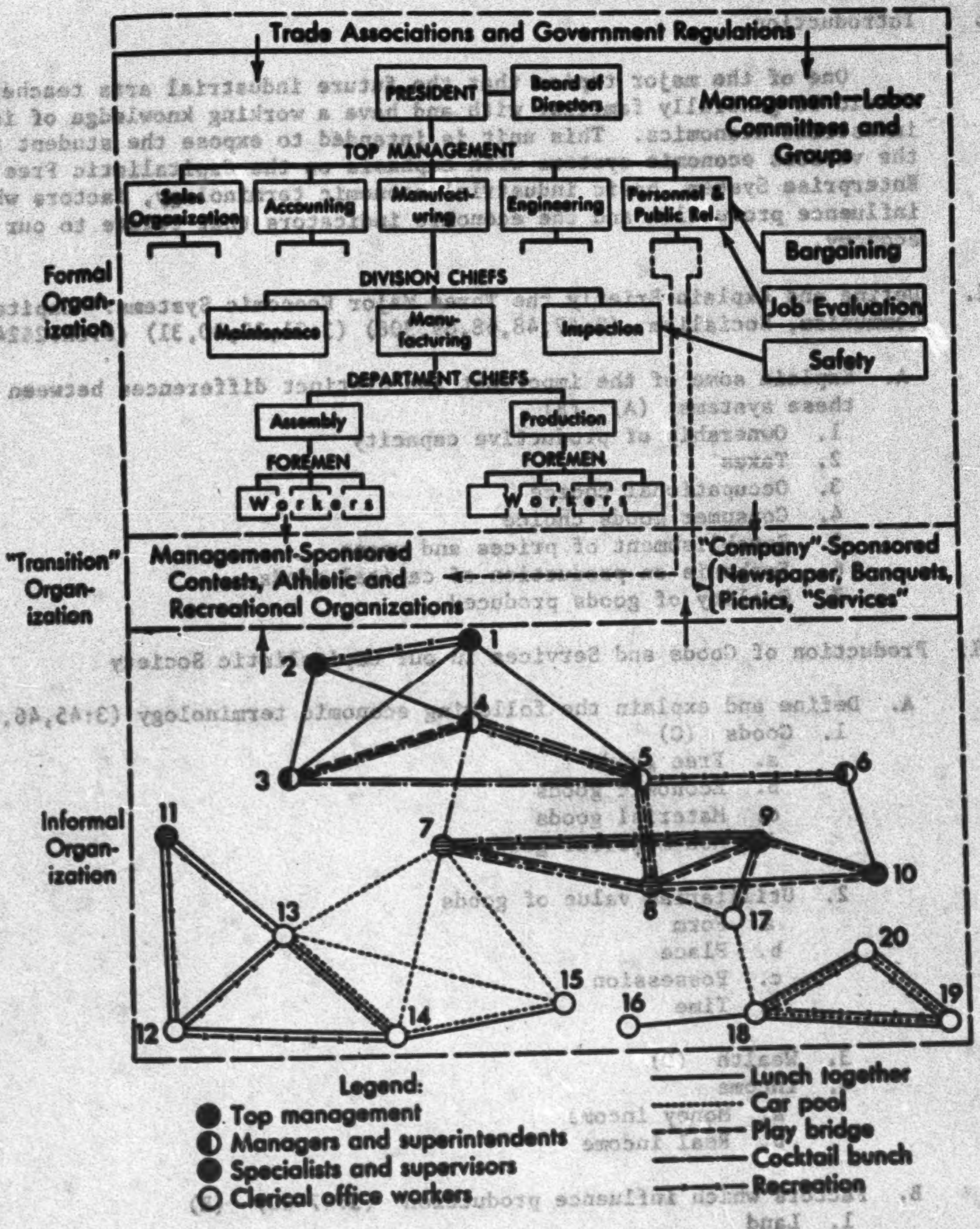

INDUSTRIAL MANAGEMENT (Taylor)
1903
INSTITUTIONAL ECONOMICS (K. Marx)
1867
INDUSTRIAL PSYCHOLOGY
1911
INDUSTRIAL & LABOR ECONOMICS
1899
INDUSTRIAL SOCIOLOGY (Mc Iver)
PERSONNEL MGMT.
1919
1917
BUSINESS ADMINISTRATION (Mayo)
1932
SOCIOMETRY (Moreno)
PUBLIC ADMIN.
1933
1935
SOCIATRY GROUP DYNAMICS (Levih)
1945
P. (Meadows)
1950
KNOWLEDGE OF INDUSTRIAL RELATIONS

The Relation of Scientific Knowledge to Administrative Functions of Personnel Relations, General Administration, and Industrial Relations.

"CONDENSED FROM MILLER AND FORM INDUSTRIAL SOCIOLOGY FIG. 1."

F

THE SOCIAL ORGANIZATION OF MANAGEMENT


Trade Associations and Government Regulations
PRESIDENT
Board of Directors
Management—Labor Committees and Groups
TOP MANAGEMENT
Sales Organization
Accounting
Manufacturing
Engineering
Personnel & Public Rel.
Bargaining
Job Evaluation
Safety
Formal Organization
DIVISION CHIEFS
Maintenance
Manufacturing
Inspection
DEPARTMENT CHIEFS
Assembly
Production
FOREMEN
FOREMEN
Workers
Workers
"Transition" Organization
Management-Sponsored Contests, Athletic and Recreational Organizations
"Company"-Sponsored Newspaper, Banquets, Picnics, "Services"
Informal Organization
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Legend:
● Top management
◐ Managers and superintendents
● Specialists and supervisors
○ Clerical office workers
Lunch together
Car pool
Play bridge
Cocktail bunch
Recreation

Source: Miller & Form, Industrial Sociology, p. 151

INDUSTRIAL ECONOMICS
(Seminar Unit - 5)

I. **Introduction**

One of the major topics that the future industrial arts teachers should be generally familiar with and have a working knowledge of is industrial economics. This unit is intended to expose the student to the various economic systems with emphasis on the Capitalistic Free Enterprise System, basic industrial economic terminology, factors which influence production and the economic indicators that relate to our economy.

II. Define and Explain Briefly the Three Major Economic Systems: Capitalism, Communism, Socialism (9:47,48,68,69,308) (3:21,22,30,31) (6:Ch.2&24)

A. Explain some of the important and distinct differences between these systems (A) (B)
1. Ownership of productive capacity
2. Taxes
3. Occupational choice
4. Consumer goods choice
5. Establishment of prices and wages
6. Emphasis on production of capital goods
7. Quality of goods produced

III. Production of Goods and Services in our Capitalistic Society

A. Define and explain the following economic terminology (3:45,46,47)
1. Goods (C)
    a. Free goods
    b. Economic goods
    c. Material goods
    d. Non-material goods

2. Utilitarian value of goods
    a. Form
    b. Place
    c. Possession
    d. Time

3. Wealth (D)
4. Income
    a. Money income
    b. Real income

B. Factors which influence production (3:47-60) (E)
1. Land
2. Labor
3. Capital
4. Entrepreneur

IV. Circular Flow of Inputs and Outputs (3:527,534-540) (F)

A. Household (private)
1. Furnish real inputs
a. Land
b. Labor
c. Capital
d. Entrepreneur

2. Receive Money income
a. Rent
b. Wages and salaries
c. Interest
d. Profits

3. Dispose of money income

B. Business (private profit, private non-profit, government)
1. Transform inputs into outputs by adding form, place and time utility. They also invest their own, as well as others, money savings into Real Capital Goods.

2. Receive money income from the sale of outputs and other operations

3. Dispose of money income
a. Pay households for inputs
b. Retain some earnings
c. Pay taxes

4. Organized into four legal forms
a. Sole proprietorship
b. Partnership
c. Co-operative
d. Corporation

C. Forces of supply and demand
1. Input markets
2. Output markets
3. Government intervention

V. Taking Stock in Our Free Economy (3:Ch.25) (G) (H)

A. Define and explain the determination and use of the following indicators as they relate to our economy
1. Gross National Product (GNP)
2. Not National Product (NNP)
3. National Income (NI)
4. Personal Income (PI)
5. Disposal Personal Income (DPI)
6. Personal Savings (PS)

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INDUSTRIAL ECONOMICS

INDEX TO TRANSPARENCIES

A. Capitalism - Communism - Socialism

B. Working Time Required to Buy Standard Quantities of Selected Items, 1959

C. Goods - Wealth - Income

D. Goods - Wealth - Income (Continued)

E. Factors Influencing Production

F. Circular Flow Diagram

G. Taking Stock in Our Free Economy

H. Gross National Product

A

CAPITALISM - COMMUNISM - SOCIALISM

COMPARE

1. WHO OWNS & OPERATES PRODUCTIVE CAPACITY
2. WHAT ABOUT TAXES
3. PERSONAL INCOME
4. OCCUPATIONS
5. CONSUMER GOODS
6. WHO SETS PRICES & WAGES
7. CIVIL & POLITICAL LIBERTIES
8. RIGHTS OF VOTERS
9. PRODUCTION OF CAPITAL GOODS
10. QUANTITY OF GOODS PRODUCED

B

WORKING TIME REQUIRED TO BUY STANDARD QUANTITIES OF SELECTED ITEMS, 1959

	MOSCOW	NEW YORK
RYE BREAD	9 MIN.	6 MIN.
ROAST BEEF	82 MIN.	21 MIN.
BUTTER	184 MIN.	20 MIN.
MAN'S SHIRT	15 HRS.	1 HR.
WOMAN'S DRESS	73 HRS.	4 HRS.
MAN'S SHOES	61 HRS.	7 HRS.

SOURCE: U. S. BUREAU OF LABOR STATISTICS

GOODS - WEALTH - INCOME

WHAT ARE GOODS
1. FREE GOODS
2. ECONOMIC GOODS
   - A. MATERIAL
   - B. NON-MATERIAL

UTILITY ... THAT QUALITY WHICH SATISFIES A WANT.

1. FORM
2. PLACE
3. POSSESSION
4. TIME

PRODUCTION ... THE PROCESS OF CREATING A UTILITARIAN QUALITY IN GOODS.

D

GOODS - WEALTH - INCOME (CONT.)

WEALTH . . . ECONOMIC GOODS HAVING UTILITARIAN VALUE.

EG. TOOLS, MACHINES, BUILDINGS, OFFICE EQUIPMENT, ETC.

NOTE: MONEY, STOCKS, PATENTS, COPYRIGHTS, GOODWILL, ETC. DO NOT CONSTITUTE WEALTH.

INCOME

1. MONEY INCOME
2. REAL INCOME

EG.

MONEY INCOME $6000, REAL INCOME $6000, (1962)

MONEY INCOME $6000, REAL INCOME $5455, (1964)

DUE TO INFLATION RISE OF 10% OVER 1962

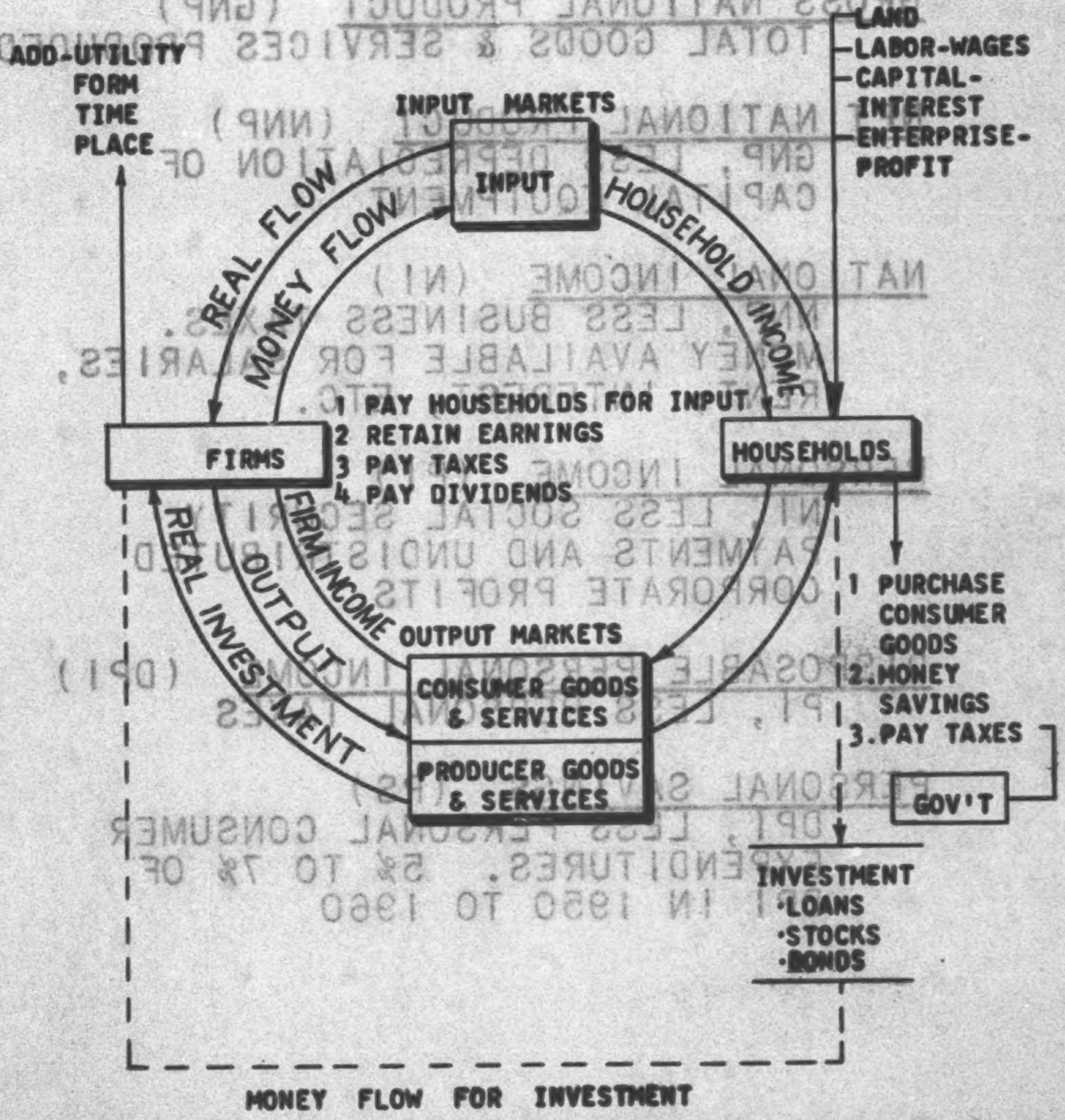
FACTORS INFLUENCING PRODUCTION

1. LAND ... NATURAL RESOURCES
2. LABOR ... HUMAN EFFORT
3. CAPITAL ... GOODS USED TO PRODUCE GOODS
4. ENTREPRENEUR ... DECIDES WHAT RISKS TO TAKE

WHAT ABOUT OVER-PRODUCTION

F

CIRCULAR FLOW DIAGRAM


ADD-UTILITY
FORM
TIME
PLACE
INPUT MARKETS
INPUT
REAL FLOW
MONEY FLOW
HOUSEHOLD INCOME
LAND
LABOR-WAGES
CAPITAL-
INTEREST
ENTERPRISE-
PROFIT
FIRMS
1 PAY HOUSEHOLDS FOR INPUT
2 RETAIN EARNINGS
3 PAY TAXES
4 PAY DIVIDENDS
HOUSEHOLDS
REAL INVESTMENT
OUTPUT
FIRM INCOME
OUTPUT MARKETS
CONSUMER GOODS & SERVICES
PRODUCER GOODS & SERVICES
1 PURCHASE CONSUMER GOODS
2. MONEY SAVINGS
3. PAY TAXES
GOV'T
INVESTMENT
·LOANS
·STOCKS
·BONDS
MONEY FLOW FOR INVESTMENT

G

TAKING STOCK IN OUR FREE ECONOMY

GROSS NATIONAL PRODUCT (GNP)
TOTAL GOODS & SERVICES PRODUCED

NET NATIONAL PRODUCT (NNP)
GNP, LESS DEPRECIATION OF CAPITAL EQUIPMENT

NATIONAL INCOME (NI)
NNP, LESS BUSINESS TAXES. MONEY AVAILABLE FOR SALARIES, RENT, INTEREST, ETC.

PERSONAL INCOME (PI)
NI, LESS SOCIAL SECURITY PAYMENTS AND UNDISTRIBUTED CORPORATE PROFITS

DISPOSABLE PERSONAL INCOME (DPI)
PI, LESS PERSONAL TAXES

PERSONAL SAVINGS (PS)
DPI, LESS PERSONAL CONSUMER EXPENDITURES. 5% TO 7% OF DPI IN 1950 TO 1960

H

GROSS NATIONAL PRODUCT

IN A LITTLE OVER 300 YEARS OUR GNP HAS GROWN FROM NOTHING TO $285 BILLION BY THE YEAR 1950.

FROM 1950 TO 1965 OUR GNP HAS INCREASED TO IT'S PRESENT LEVEL OF $670 BILLION.

BY 1970 WE ARE EXPECTED TO BE AT APPROXIMATELY $850 BILLION, INCREASING AT THE RATE OF ABOUT $40 BILLION PER YEAR.

FORMS OF BUSINESS OWNERSHIP

(Seminar Unit - 6)

I. Introduction

As future teachers of industrial arts, it is imperative that the students are aware of the basic forms of business ownership as well as the advantages and disadvantages of each. This unit will provide this orientation.

II. Briefly Explain the Basic Forms of Business Ownership (1:449) (2:83,95,96,97) (A)

A. Free private ownership with profit motive
B. Free private ownership, non-profit
C. Government owned and/or operated, non-profit

III. Explain in Detail the Advantages, Disadvantages and Operations of the Three Forms of Free Private Ownership which have Profit as the Basic Motive

A. Sole Proprietorship, general description (1:450) (2:83-84) (B)
   1. Advantages
   2. Disadvantages

B. Partnership, general description (1:450-451) (2:84-86) (C)
   1. Advantages
   2. Disadvantages

C. Corporation (1:453-457) (2:86-88)
   1. Definition (5:80) (D)
   2. Formation of a Corporation (E)
   3. Management of a Corporation (F)
   4. Ownership of a Corporation

D. Corporation Finance (1:457-460) (2:88-95)
   1. Creditors - role, function, liability (G)
   2. Bondholders - role, function, liability
   3. Stockholders - role, function, liability
   4. Function of Corporation Capital Stock (H)
   5. Important Terminology
   6. Preferred Stock
   7. Common Stock
   8. Corporation bonds and short term notes (I)

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FORMS OF BUSINESS OWNERSHIP

INDEX TO TRANSPARENCIES

A. Business Ownership and Controls

B. Sole Proprietorship

C. Partnership

D. The Business Corporation

E. Formation of Corporations

F. Management of Corporation - Ownership of Corporation

G. Creditors - Bondholders - Stockholders
Priority of Liability

H. Corporation Capital Stock

I. Corporation Bonds and Short Term Notes

A

BUSINESS OWNERSHIP AND CONTROL

5 BASIC FORMS

3 HAVE PROFIT MOTIVE AND RUN FREELY
1 IS NON-PROFIT AND OPERATES FREELY
1 IS GOVERNMENT OPERATED, NON-PROFIT

THOSE THAT OPERATE FOR A PROFIT ARE THE:

A. SOLE PROPRIETORSHIP

B. PARTNERSHIP

C. BUSINESS CORPORATION

SOLE PROPRIETORSHIP

ADVANTAGES:

1. EASY TO FORM
2. EASY TO DISSOLVE
3. CONTROL AND DECISIONS BY INDIVIDUAL
4. ALL PROFITS TO OWNER
5. TAX BENEFITS OVER CORPORATION

DISADVANTAGES:

1. DIFFICULT TO ENLARGE - NOT ENOUGH CAPITAL
2. CREDITORS CAN ATTACH PERSONAL PROPERTY
3. MUST RELY ON OWN SKILL AND ABILITY
4. BUSINESS DIES AT DEATH OF OWNER

PARTNERSHIP

ADVANTAGES:

1. GREATER CAPITAL
2. MORE BORROWING POWER
3. COMBINATIONS OF TALENT WITH SIMILAR INCENTIVES
4. SOME TAX ADVANTAGES OVER CORPORATION

DISADVANTAGES:

1. CREDITORS CAN ATTACH PERSONAL PROPERTY OF ANY PARTNER
2. CAN'T WILL RIGHTS WITHOUT CONSENT OF ALL CONCERNED
3. DISAGREEMENT EASY BETWEEN PARTNERS
4. DEATH OF THE FIRM WHEN ANY PARTNER DIES

D

THE BUSINESS CORPORATION

THE BUSINESS CORPORATION IS AN ARTIFICIAL BEING, INVISIBLE, INTANGIBLE, AND EXISTING ONLY IN THE EYES OF THE LAW. THE CORPORATION POSSESSES THE POWERS TO:

1. OWN PROPERTY
2. ENTER INTO CONTRACT
3. TO SUE
4. TO BE SUED

FORMATION OF CORPORATIONS

1. GENERALLY A MINIMUM OF THREE PEOPLE
2. THEY APPLY TO THE STATE IN WHICH THEY WILL DO BUSINESS. THE APPLICATION WILL GENERALLY CONTAIN THE FOLLOWING:
    - A. NAMES OF BOARD OF DIRECTORS
    - B. OBJECTIVES
    - C. MAXIMUM NUMBER OF SHARES OF CAPITAL STOCK
    - D. CLASSES OF STOCK
    - E. VALUE OF THE STOCK
    - F. METHODS OF STOCK TRANSFER
    - G. PRINCIPAL PLAN OF THE BUSINESS
    - H. POWER, RIGHTS AND PRIVILEGES OF THE STOCKHOLDERS

NOTE:
THE ACTUAL REQUIREMENTS WILL VARY FROM STATE TO STATE.

F

MANAGEMENT OF CORPORATION

THE CORPORATION IS OWNED BY THE STOCKHOLDERS BUT MANAGED BY THE BOARD OF DIRECTORS WHO ARE ELECTED BY THE STOCKHOLDERS.

OWNERSHIP OF THE CORPORATION

STOCKHOLDERS OWN THE CORPORATION, BUT THEY SHARE IN THE PROFITS ONLY AFTER ALL PRIOR LIENS HAVE BEEN MET.

CREDITORS - BONDHOLDERS - STOCKHOLDERS

PRIORITY OF LIABILITY

1. CREDITORS HAVE FIRST LIEN.
2. BONDHOLDERS AFTER CREDITORS BUT BEFORE STOCKHOLDERS.
3. STOCKHOLDERS OF PREFERRED STOCK NEXT.
4. STOCKHOLDERS OF COMMON STOCK LAST.

H

CORPORATION CAPITAL STOCK

FUNCTION:

TO RAISE CAPITAL

IMPORTANT TERMS:

1. ISSUED STOCK
2. UNISSUED STOCK
3. TREASURY STOCK
4. PAR-VALUE
5. NO-PAR-VALUE
6. BOOK VALUE
7. MARKET VALUE

WHAT IS PREFERRED STOCK?

WHAT IS COMMON STOCK?

CORPORATION BONDS AND SHORT TERM NOTES

WHEN LARGE SUMS OF MONEY NEED TO BE RAISED A CORPORATION MAY "FLOAT A BOND" FOR PLANT EXPANSION OR OTHER LONG TERM CAPITAL ITEMS. THIS WILL BE DONE ONLY AFTER ALL STOCK HAS BEEN ISSUED. SUCH A CORPORATION BOND IS A WRITTEN PROMISE TO PAY:

1. INTEREST AT A GIVEN RATE PERIODICALLY
2. PRINCIPAL AT SPECIFIED TIME.

SHORT TERM NOTES ARE BORROWED TO MEET IMMEDIATE NEEDS SUCH AS PAYROLL, MATERIALS, SIMPLE REPAIRS, ETC. FROM COMMERCIAL BANKS. SUCH BORROWING IS DONE IN STRICT ANTICIPATION OF INCOME.

CURRENT ISSUES FACING AMERICAN INDUSTRY
(Seminar Unit - 7)

I. Introduction

Both students and teachers of industrial arts should keep abreast of current significant issues and problems that confront American industry. This unit should expose the issues current at the time of presentation and, hopefully, would inspire the student to keep up to date and continually knowledgeable of those forces that affect industry.

Because of the dynamic nature of this topic, this outline is not intended to have an indefinite usefulness although several "issues" indicated herein may be prominent for some time. Those described in this outline represent the major concerns of American industry at the time of this project. Likewise, the order of the "issues" in this outline is not necessarily significant with respect to their overall importance or affect on a particular industry or industry as a whole.

II. Initial Comments Regarding Issues Confronting American Industry

- A. Introduce each category by general title (A)
- B. Generally explain their overall effect
- C. Explain how they have one common element of concern (economic) though individually these may be to a greater or lesser degree

III. Explain Each Issue in Detail Indicating the Specific Problems in Each Category and How Each is of Concern to Industry

- A. Shortage of skilled workers (B)
  - 1. Low unemployment
  - 2. High employment
  - 3. Special shortages in these critical fields
    - a. Engineers
    - b. Scientists
    - c. Mathematicians
    - d. Draftsmen
    - e. Industrial nurses
    - f. Machine operators
    - g. Tool and die makers
    - h. Technicians
  - 4. Fewer and more costly college graduates
    - a. Military
    - b. Graduate school
  - 5. Adds to the inflationary problems
    - a. Forces employers to bid against each other for workers
    - b. Forced to hire less productive workers
    - c. Limits production and encourages higher prices
- B. Taxes (C)
  - 1. Increasing Federal, State, and Local taxes. Many new local taxes

2. What kinds of taxes
    a. Income
    b. Occupational - privilege
    c. Payroll
    d. Sales and use
    e. Excise
    f. Real property
    g. Gross - receipt
    h. Inventory
    i. Etc.
3. Cost of collection often greater than the revenue produced
4. Rising corporation tax percentagewise
5. Collection of corporate federal taxes now on "pay-as-you-go" basis

C. Rising indirect labor costs (D)
1. Federal unemployment compensation
2. Sick leave
3. Personal leave
4. Maternity leave
5. Insurance programs
    a. Health
    b. Accident
    c. Life
    d. Loss of pay

6. Stock purchase plans
7. Retirement
8. Social Security
9. Vacations
10. Holidays
11. Suggestion plans
12. Coffee breaks
13. Company sponsored recreation programs
14. Company newspaper

D. Automation (E)
1. Loss of specific jobs
2. Retraining or transferring of employees
3. Industry and workers must accept "change"
4. Industry must automate to be competitive
5. Strong union demands over automation
    a. Supplemental unemployment
    b. Normal attrition only
    c. Work spreading
    d. Early retirement
    e. Relocation expenses
    f. Subsidized retraining

E. Increasing demands of labor (F)
1. Federal uniform unemployment compensation (H.R. #8282)
2. Minimum wage hike from $1.25 to $1.65 by 1968.
3. Shorter work week

4. Political strength of organized labor
5. Repeal of Taft Hartley Act Sec 14B
6. Special demands over automation

F. Government controls (G)
  1. Direct
    a. Labor laws
    b. Pure food and drug laws
    c. Rising credit costs
    d. Removing 7% tax credit on capital expansion, later reestablishing this credit (this creates an air of uncertainty for industry)

  2. Indirect
    a. "Suggested" wage and price "guidelines"
    b. Awarding of government contracts
    c. Intervention in labor disputes

G. Social and political presures (H)
  1. Special demands of minority groups
  2. Migrant workers
  3. Social programs provided by government
    a. Medicare
    b. War on Poverty (EOA)
    c. Education
    d. Vista
    e. Peace Corp
    f. Teacher Corp

  4. Highly mobile society
  5. More leisure time
  6. Uncertain National Defense demands

H. Foreign Competition (I)
  1. Major competitors
    a. Japan
    b. Germany
    c. Italy
    d. Scandanavian countries

  2. Products requiring large amounts of unskilled labor are greatest hurt
  3. American business must now operate in a "World Economy"
  4. Biggest competition in
    a. Automobiles
    b. Photography
    c. Electronics
    d. Office business equipment
    e. Small component parts
    f. Some raw materials; steel, rubber products, plastics
    g. Machine tools of extremely high quality

Bibliography

The resources used for this outline were many and varied. Because of the extensive and dynamic nature of this topic, each point has not been fully documented. This information has been gathered from current issues of news magazines, government publications, selected journals, labor magazines and other periodicals.

The following list of selected references is intended to provide a partial source of current information and data on the topics outlined as well as others which may come to the forefront. It will be necessary for the lecturer of this topic to keep abreast of the "issues" and developments by utilizing these and other resources.

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3. Barron's: National Business and Financial Weekly, Dow Jones and Company, 30 Broad Street, New York 4, New York
4. Business Management, Management Magazines, Inc., 22 West Putnam Avenue, Greenwich, Connecticut
5. Business Week, McGraw-Hill Publishing Company, 330 West 42nd Street, New York 36, New York
6. COPE (Committee on Political Education), AFL-CIO, 815 Sixteenth Street, N.W., Washington, D. C., 20006
7. Dun's Review and Modern Industry, Dun & Bradstreet Publishing Corp., 99 Church Street, New York 8, New York
8. Factory, McGraw-Hill Publishing Company, 330 West 42nd Street, New York 36, New York
9. Forbes, Forbes, Inc., 70 Fifth Avenue, New York 11, New York
10. Fortune, Time, Inc., 540 N. Michigan Avenue, Chicago 11, Illinois
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18. **U. S. News and World Report**, U.S. News and World Report, Inc., 230 N. Street, N.W., Washington 7, D. C.

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CURRENT ISSUES FACING AMERICAN INDUSTRY

INDEX TO TRANSPARENCIES

A. Current Issues Facing American Industry

B. Shortage of Skilled Workers

C. Taxes

D. Rising Indirect Labor Costs

E. Automation

F. Increasing Demands of Labor

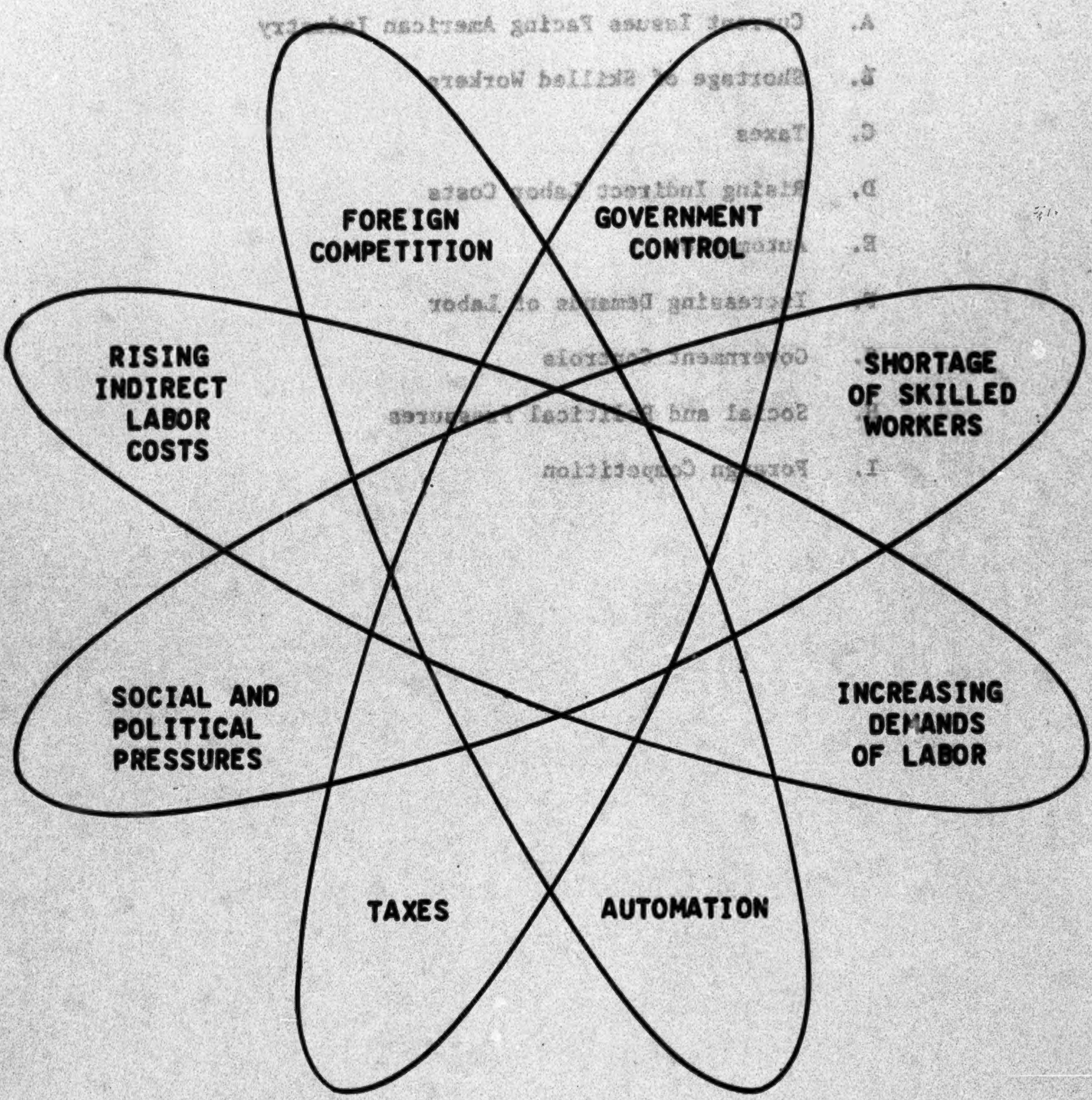
G. Government Controls

H. Social and Political Pressures

I. Foreign Competition

A

CURRENT ISSUES FACING AMERICAN INDUSTRY


FOREIGN COMPETITION

GOVERNMENT CONTROL

RISING INDIRECT LABOR COSTS

SHORTAGE OF SKILLED WORKERS

SOCIAL AND POLITICAL PRESSURES

INCREASING DEMANDS OF LABOR

TAXES

AUTOMATION

SHORTAGE OF SKILLED WORKERS

B

1. UNEMPLOYMENT NOW LOWEST IN 9 YEARS. FEBRUARY 1966 ONLY 3.7% UNEMPLOYMENT.

2. HIGHEST EMPLOYMENT IN HISTORY. FEBRUARY 1966 71.6 MILLION EMPLOYED.

3. SPECIAL SHORTAGES IN THESE FIELDS:

   - ENGINEERS
   - SCIENTISTS
   - MATHEMATICIANS
   - DRAFTSMEN
   - NURSES
   - MACHINE OPERATORS
   - TOOL & DIE MAKERS
   - TECHNICIANS

4. COLLEGE GRADUATES COST MORE, AND THERE ARE LESS OF THEM. MORE GOING TO GRADUATE SCHOOL AND INTO THE MILITARY.

5. ADDS TO THE INFLATIONARY PROBLEMS.

   a. FORCES EMPLOYERS TO BID AGAINST EACH OTHER FOR WORKERS.

   b. FORCED TO HIRE LESS PRODUCTIVE WORKERS.

   c. LIMITS PRODUCTION AND ENCOURAGES HIGHER PRICES.

FORTUNE, FEBRUARY 1966, "THE PRIVATE WORLD OF THE CLASS OF 66"

TAXES

1. INCREASING FEDERAL, STATE, AND LOCAL TAXES. MANY NEW LOCAL TAXES.
2. WHAT KINDS OF TAXES:
    - INCOME
    - OCCUPATIONAL-PRIVILEGE
    - PAYROLL
    - SALES AND USE
    - EXCISE
    - REAL PROPERTY
    - GROSS-RECEIPT
    - INVENTORY
    - ETC.
3. OFTEN THE COST OF COLLECTION IS GREATER THAN THE REVENUE PRODUCED.
4. RISING CORPORATE TAXES PERCENTAGEWISE.
5. COLLECTION OF CORPORATE FEDERAL TAXES HAS JUST BEEN INCREASED ON A "PAY-AS-YOU-GO" BASIS.

D

RISING INDIRECT LABOR COSTS

1. FEDERAL UNEMPLOYMENT COMPENSATION (H.R. #8282)
2. SICK LEAVE
3. PERSONAL LEAVE
4. MATERNITY LEAVE
5. INSURANCE PROGRAMS (HEALTH, ACCIDENT, LIFE, LOSS OF PAY, ETC.)
6. STOCK PURCHASE PLANS
7. RETIREMENT
8. SOCIAL SECURITY
9. VACATIONS
10. HOLIDAYS
11. SUGGESTION PLANS
12. COFFEE BREAKS
13. COMPANY SPONSORED RECREATION
14. COMPANY-EMPLOYEE NEWSPAPER

THE TRUE VALUE OF THESE BENEFITS ARE SELDOM UNDERSTOOD BY WORKERS.

E

AUTOMATION

1. APPROXIMATELY 40,000 JOBS DISAPPEAR EACH WEEK DUE TO AUTOMATION.
2. PRESENTLY, MOST EMPLOYEES ARE RETRAINED, TRANSFERRED OR OTHERWISE ABSORBED IN THE SAME COMPANY.
3. INDUSTRY AND WORKERS MUST ACCEPT "CHANGE" AND MAKE ADJUSTMENTS.
4. INDUSTRY MUST AUTOMATE TO BE COMPETITIVE.
5. STRONG UNION DEMANDS OVER AUTOMATION
    - a. SUPPLEMENTAL UNEMPLOYMENT COMPENSATION (1/3 OF CONTRACTS)
    - b. NORMAL ATTRITION ONLY
    - c. WORK SPREADING
    - d. EARLY RETIREMENT
    - e. RELOCATION EXPENSES
    - f. SUBSIDIZED RETRAINING

(MANY PEOPLE FEEL THAT THIS HAS BEEN THE ONLY REAL ISSUE THAT THE UNIONS HAVE HAD FOR MANY YEARS)

F

INCREASING DEMANDS OF LABOR

1. FEDERAL UNEMPLOYMENT COMPENSATION (H.R. #8282) IN PRESENT FORM WOULD PROVIDE:
    a. REMOVE STATES RIGHTS
    b. COST EMPLOYER 60% MORE
    c. VOLUNTARY "QUITTERS" ELIGIBLE
    d. MISCONDUCT CASES ELIGIBLE
    e. PAYMENT PERIOD WOULD INCREASE FROM PRESENT LEVEL TO 1 1/2 YEARS
    f. PRESENT AVERAGE BENEFIT OF $50. WEEK WOULD GO TO $125. WEEK
2. MINIMUM WAGE HIKE FROM $1.25 TO $1.65 (1968)
3. SHORTER WORK WEEK (35 HOURS)
4. POLITICAL STRENGTH OF ORGANIZED LABOR
5. REPEAL OF TAFT-HARTLEY ACT, SEC 14B (SO CALLED, "RIGHT TO WORK RULE")
6. SPECIAL DEMANDS OVER AUTOMATION

G

GOVERNMENT CONTROL

1. DIRECT:
    a. LABOR LAWS
    b. PURE FOOD AND DRUG LAWS
    c. RISING CREDIT COSTS
    d. REMOVING 7% TAX CREDIT ON CAPITAL EXPANSION, LATER REESTABLISHING (AIR OF UNCERTAINTY)
2. INDIRECT:
    a. "SUGGESTED" WAGE AND PRICE "GUIDELINES"
    b. AWARDING OF GOVERNMENT CONTRACTS
    c. INTERVENTION IN LABOR DISPUTES

SOCIAL AND POLITICAL PRESSURES

1. SPECIAL DEMANDS OF RACIAL, RELIGIOUS AND OTHER MINORITY GROUPS:

   EG. NAACP

   URBAN LEAGUE

   CORE

2. MIGRANT WORKERS

3. SOCIAL PROGRAMS PROVIDED BY GOVERNMENT INCREASE CORPORATE TAXES AND PARTICIPATION:

   EG. MEDICARE

   WAR ON POVERTY

   EDUCATION ACTS

   VISTA

   PEACE CORPS

4. HIGHLY MOBILE SOCIETY

5. MORE LEISURE TIME

FOREIGN COMPETITION

1. THREAT FROM JAPAN AND EUROPE.
2. PRODUCTS AND INDUSTRIES THAT REQUIRE LITTLE SKILL AND CONSIDERABLE LABOR ARE GREATEST HURT.
3. AMERICAN BUSINESS MUST NOW OPERATE ON A "WORLD ECONOMY" NOT "AMERICAN ECONOMY" ALONE.
4. BIGGEST COMPETITORS:
    - AUTOS
    - PHOTOGRAPHY
    - ELECTRONICS
    - TYPEWRITERS
    - SMALL COMPONENT PARTS
    - MACHINE TOOLS

HISTORY OF AMERICAN INDUSTRY

(Seminar Unit - 8)

I. Introduction

A good foundation and understanding of the historical growth and development of American Industry is very desirable for all Field Study participants. This presentation will describe the major events, periods, and circumstances that have occurred since the early colonial years. Also discussed are both current and future implications for our industrial society.

II. Causes of Industrial Growth (9:63-64) (6:9-14 and 43-54)

A. Land
B. Labor
C. Capital
D. Entrepreneur
E. Transportation
F. Technology
G. Markets
H. Natural Resources (4:Ch.21)
  1. United States has
    a. Copper
    b. Iron
    c. Petroleum
    d. Gas
    e. Lead
    f. Zinc
    g. Limestone
  2. United States needs
    a. Tin
    b. Nickel
    c. Tungsten
    d. Manganese
    e. Bauxite
    f. Cobalt
    g. Chromium

III. Colonial Period to 1800

A. Early industrial technology (10:Ch.1 & 3)

1. Quality	5. Technology
2. Quantity	6. Skilled Labor
3. Machinery	7. Power
4. Tools	8. Products

B. Household industries (1:647-748) (10:39-48)
  1. Cost to operate
  2. Available labor
  3. Working conditions and hours
  4. Convenience

5. Products
    a. Shoes and leather products
    b. Furniture
    c. Textiles
    d. Tools
    e. Handcrafts

C. Commercial industries (1:648-649) (10:62-88)
  1. Small in size
  2. Facilities limited and poor
  3. Working conditions and hours
  4. Products

a. Lumber	d. Sugar refining
b. Shipbuilding	e. Paper
c. Iron	f. Glass

D. Scarcity of labor (10:159) (4:102-108)
  1. Women
  2. Children
  3. Negro slaves
  4. Indentured servants

E. Colonial finance (6:79-92)
  1. Income
  2. Monetary policy
  3. Paper money
  4. Metallic coins - silver, gold
  5. Economic controls

IV. American Industrial Revolution, 1800-1850 (2:Ch.2 & 3)

A. Steady economic growth and industrial development (6:196-221) (10:131-137)
  1. Decline of household industries
  2. More and better machines
  3. Growth of labor class
  4. Beginning of organized labor
  5. Mobility of worker and product distribution

B. Beginning of mass production (10:137)
C. The factory system (4:384-388)

V. Period of Mechanization - 1850 - 1950

A. Post Civil War manufacturing (6:Ch.15,16,17)
  1. Revolution in mineral production
  2. Growth in specific industries
    a. Chemicals (8:Ch.15)
    b. Petroleum (8:Ch.7)
    c. Steel (8:Ch.9)
    d. Electric power (8:Ch.25)

B. Rise in employment (6:505)

C. Gross National product growth - 1865-1914 (6:288-308)
D. Industrial expansion and rise of big business (6:334-358)
E. Rapid scientific and technological change (13:667) (14)
F. Development of scientific principles of management (5:12)
G. New power producing inventions (1:654) (6:531)
    1. Electricity
    2. Electric motors - generators
    3. Gas engines

H. Beginning of corporations (6:359-360)
    1. Need for large amount of capital
    2. Reduce liability of ownership
    3. Change in business tax structure

I. New consumer products prior to World War II (6:631)
    1. Automobiles
    2. Aluminum
    3. Radio
    4. Electrical equipment

VI. Post World War II

A. Second Industrial Revolution (10:444) (1:687) (6:659-660)
    1. Aerospace
    2. Atomic energy
    3. Electronic controls
    4. Automation - cybernetics
    5. Communication media
    6. Increased emphasis on Research and Development

B. Present and future industrial America
    1. Economy at mid-century (6:649-672)
    2. Change in the industrial system (7:Ch.1)
    3. The corporation (7:Ch.7)

C. International expansion
    1. Investment and development of plants and trade in foreign countries

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HISTORY OF AMERICAN LABOR

(Seminar Unit - 9)

I. Introduction

It is desirable for all Field Study participants to have a basic knowledge of the history and growth of the American Labor Movement. This unit will provide this exposure.

II. The Colonial and Revolutionary Era (200 years, 1600-1800) (A)

- A. Colonial labor (12:3-46)
    - 1. Pioneer society
    - 2. Agricultural economy
    - 3. Artisan and itinerant labor force

- B. Composition of labor force (12:7-23)
- C. Scarcity of workers in America and attempts to remedy situation (12:6 and 53)
- D. Scarcity of machines and money, also 3 M's

III. The Transitional Era - America grows in the Nineteenth Century (12:47-186) (B)

- A. Transformation of Economic enterprise
- B. First trade unions and labor parties (3:Ch.I & II)
    - 1. A conspiracy doctrine and "repressive" attitude toward labor until 1842 (14:5-11)

- C. Political and social reform attempts by workers - programs and objectives (5:46-53 and 74-78)

- D. Labor organizations (5:86-104)
    - 1. Knights of Labor
    - 2. National organizations
    - 3. American Federation of Labor

- E. The Civil War - aftermath - growth of industrialization - growth of population - impact of immigration (3:Ch.II) (5:61-79)
    - 1. Basic economic change - business cycles
    - 2. Legislation of 1890's
    - 3. Strike activity

IV. The Modern Period from 1900 to Present (12:187-434) (5:80-306) (C)

- A. The triumph of the machine
    - 1. Mass production
    - 2. Automated processes
    - 3. The World Wars
    - 4. Impact on labor growth

- B. American Labor philosophy - "Pure and Simple Unionism"

C. Role of government
    1. Injunction (12:204-207 and 319)
    2. From toleration to encouragement of organizations of workers
    3. Labor legislation (1:748-758) (D)
        a. Sherman Act
        b. Clayton Act
        c. Norris-LaGuardia Act
        d. National Labor Relations Act 1935
        e. Taft-Hartley Act

D. Basic national labor policy and recognition of collective bargaining (5:100-210)

E. The rise of the C.I.O. - industrial unionism (4:288-331)

F. Current issues of collective bargaining and labor relations in our American society (14:707-709)

G. From encouragement to balance of power position or intervention (by regulatory agencies and legislation) (12:413-434)

V. Review of Lineal Descent of Organized Labor (E)

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HISTORY OF AMERICAN LABOR

INDEX TO TRANSPARENCIES

A. Colonial Days

B. America Grows

C. Modern Period

D. Labor Law

E. Lineal Descent of Organized Labor

COLONIAL DAYS - 1600-1800

A

SCARCITY

MEN
MACHINES
AND
MONEY

AMERICA GROWS - 1800-1899

B

CONSPIRACY DOCTRINE

-- REPRESSION OF CONCERTED

ACTION - COMMON LAW

POLITICS AND SOCIAL REFORM

RISE OF INDUSTRIAL SOCIETY

-- CIVIL WAR IMPACT

LABOR ORGANIZES

MODERN PERIOD - SINCE 1900

C

NATIONAL LABOR POLICY

NATIONAL LABOR RELATIONS ACT - 1935

TAFT-HARTLEY ACT - 1947

SOCIETY OF ABUNDANCE??????

LABOR LAW

D

10 HOUR DAY FOR FEDERAL EMPLOYEES SIGNED BY PRESIDENT VAN BUREN (FIRST FEDERAL LAW AFFECTING WORKERS)	1840
COMMONWEALTH VS HUNT (SAID LABOR UNIONS WERE LEGAL)	1842
NEW HAMPSHIRE PASSED FIRST STATE LAW FOR 10 HOUR DAY	1847
PENNSYLVANIA PASSED FIRST STATE CHILD LABOR LAW	1848
FIRST FEDERAL LABOR RELATIONS LAW (INTER-STATE COMMERCE ACT) AND (ARBITRATION ACT)	1887-1888
SHERMAN ANTI-TRUST ACT (INCLUDED UNIONS)	1890
THE CLAYTON ACT (LIMITED INJUNCTIONS, OK'ed PICKETS)	1914
NORRIS-LaGUARDIA ACT (PROHIBITED MOST FEDERAL INJUNCTIONS) (OUTLAWED "YELLOW DOG" CONTRACTS)	1932
NATIONAL RECOVERY ACT (COLLECTIVE BARGAINING OK'ed, RIGHTS OF WORKERS TO JOIN UNIONS AND TAKE PART WITHOUT EMPLOYER INTERFERENCE)	1933
NATIONAL LABOR RELATIONS ACT (WAGNER ACT) (FIRST FEDERAL SUPPORT FOR WORKERS TO ORGANIZE AND BARGAIN COLLECTIVELY)	1935
TAFT-HARTLEY ACT (OUTLAWED "CLOSED SHOP", SECONDARY BOYCOTTS AND OTHER UNFAIR LABOR AND EMPLOYER PRACTICES. "RIGHT TO WORK" 14 B)	1947

E

LINEAL DESCENT OF ORGANIZED LABOR

COMMUNITY CRAFT GUILDS OF EUROPE	MIDDLE AGES
ENGLISH COMMON LAW PROHIBITED UNIONS	EDWARD Ist UNTIL 1825
EARLY AMERICAN COLONIAL PERIOD	1600 - 1790
EARLY "LOCAL" TRADE UNIONS	1790 - 1852
RISE OF NATIONAL UNIONS	1852 - 1867
KNIGHTS OF LABOR	1869 - 1880
FEDERATION OF ORGANIZED TRADE AND LABOR UNIONS	1881
AFL (SAMUEL GOMPERS)	1886
COMMITTEE FOR INDUSTRIAL ORGANIZATIONS (JOHN L. LEWIS AND 7 OTHER PRESIDENTS)	1935
CIO	1938
AFL - CIO (MERGER)	1955

ORGANIZATION AND STRUCTURE OF AMERICAN INDUSTRY
(Seminar Unit - 10)

I. Introduction

A basic understanding of the existing structure and principles of organization of industries is necessary so that the student entering a field study situation can better assimilate his new experiences. This outline will deal with types of organizations and management functions and interrelationships. It is designed to give the student a basic foundation and knowledge about the most common functions of management and types of organizations in use in American business firms.

II. Structure of Business

- A. Definition (Quote #1)
- B. Relationship between resources and objectives (A) (4:29)
    1. Resources available
    2. Use of resources
    3. Environmental forces
    4. Objectives
- C. Manufacturing - factors for success (B) (1:3-5)
    1. Money
    2. Machines
    3. Materials
    4. Men
    5. Methods
    6. Market
    7. Management
- D. Interrelationships of factors of successful manufacturing (C) (1:3)
- E. Organizing factors for manufacturing (D) (4:97)
- F. Factors and elements of management
    1. Functions of management (E) (1:5)
        - a. Planning
        - b. Organizing
        - c. Directing
        - d. Controlling
    2. Elements and steps of managing (F) (2:14-15)
        - a. Establish objectives
            - (1) Gather information
            - (2) Synthesize information
            - (3) Plan
            - (4) Decide
        - b. Direct the attainment of objectives
            - (1) Organize
            - (2) Communicate
            - (3) Motivate
            - (4) Direct, counsel, or guide

- c. Measure results
  - (1) Measure, evaluate and control
  - (2) Develop people
  - (3) Promote innovation

- 3. Interrelationship of elements (G) (2:Chart IX)

- G. Division of management responsibilities according to activity areas (H) (2:Chart I)
  - 1. Work centered areas
    - a. Research and development
    - b. Production
    - c. Marketing
    - d. Finance and control
  - 2. Support areas
    - a. Personnel
    - b. External relations
    - c. Secretarial and legal

- H. Interrelationship between activity areas (I) (2:Chart I)

III. Organization of Industry

- A. Level of management (J) (4:142)
  - 1. Top
  - 2. Middle
  - 3. Operating

- B. Functions of levels of management (K) (4:144)
  - 1. Stockholders
  - 2. Board of directors
  - 3. President
  - 4. Vice President
  - 5. Division, plant or unit heads
  - 6. Department head, foreman, etc.
  - 7. Operatives

- C. Types of organization
  - 1. Line organization (L) (1:54)
    - a. Explanation of chart
    - b. Advantages and disadvantages (Quote #2)

  - 2. Line and staff (M) (1:55)
    - a. Explanation of chart
      - (1) Line authorities
      - (2) Staff responsibilities

    - b. Advantages and disadvantages (Quote #3)

  - 3. Other types
    - a. Committee (Quote #4)
    - b. Functional (Quote #5)

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Quote #1

Business is an institution organized and operated to provide goods and services to society under the incentive of private gain.

Wheeler, Business: An Introductory Analysis, p. 25.

Quote #2

Advantages and Disadvantages of LINE organization.

ADVANTAGES:

1. **The plan is simple and easy for employees and management to understand.**
2. **It allows for definite designation of authority and responsibilities for each position.**
3. **Each worker is responsible only to one boss, who is the immediate source of authority.**
4. **The plan makes for direct communication upward and downward along the chain of authority.**

DISADVANTAGES:

1. **Each supervisor has responsibility for several duties and cannot become expert in all of them.**
2. **The plan overburdens top executives with day to day administrative details, to the point where there is little time to devote to planning.**
3. **The plan fails to provide a specialized staff for more highly specialized management activities.**
4. **As the business grows and the chain of command increases,more and more time is needed to execute orders.**

Musselman and Hughes, Introduction to Modern Business, p. 111.

Quote #3

Advantages and Disadvantages of LINE & STAFF organization

ADVANTAGES:

1. It provides for line authority with flexibility to use staff specialists who can operate across department lines.
2. It allows for highly qualified technical specialists to advise line executives.
3. No matter where an employee works in a service, staff, research, or production department, he rarely reports to more than one person.

DISADVANTAGES:

1. Decisions may be slowed up behind line executives who are waiting for staff personnel to furnish technical assistance.
2. Staff personnel may attempt to become line officers and assert administrative control, resulting in confusion and misunderstanding.
3. The use of staff specialists increases overhead costs.

Musselman and Hughes, Introduction to Modern Business, p. 115.

Quote #4

Advantages and Disadvantages of COMMITTEE organization

ADVANTAGES:

1. It combines the judgements of several officials when decisions are being made.
2. Committees act in a less personal way than do individuals when discussing the "pros" and "cons" of an issue.
3. Committees are usually composed of specialists who can devote more time to important problems than can most line officers.

DISADVANTAGES:

1. Committees often take longer to reach a decision than does a single individual.
2. An original idea often has to be compromised and modified before committee approval can be won.
3. If an aggressive person dominates the committee, the other members may be unduly influenced by him in rendering their final decision.
4. Final decisions of the committee may not be entirely acceptable to everyone on the committee.

Musselman and Hughes, Introduction to Modern Business, p. 116.

Quote #5

Advantages and Disadvantages of FUNCTIONAL organization

ADVANTAGES:

1. Each supervisor spends all of his time directing or performing only one type of activity.
2. Each person is given a chance to grow in his specialty. That means the entire organization grows too.
3. Each person does a job for which he is specially prepared.

DISADVANTAGES:

1. Since even top ranking personnel are encouraged to specialize, few all-around executives are developed to take over in an emergency.
2. Since employees have to report to more than one supervisor, discipline tends to break down. There are just too many bosses.
3. The overlapping of authority among supervisors promotes conflict and encourages buck-passing.

Musselman and Hughes, Introduction to Modern Business, p. 113.

A

ORGANIZATION AND STRUCTURE OF AMERICAN INDUSTRY

INDEX TO TRANSPARENCIES

A. Relationship Between Resources and Objectives

B. Manufacturing - Factors for Success

C. Interrelationship of Factors for Successful Manufacture

D. Organizing Factors for Manufacturing

E. Functions of Management

F. Elements and Steps of Managing

G. Elements of Managing

H. Activity Areas

I. Interrelationship of Activity Areas

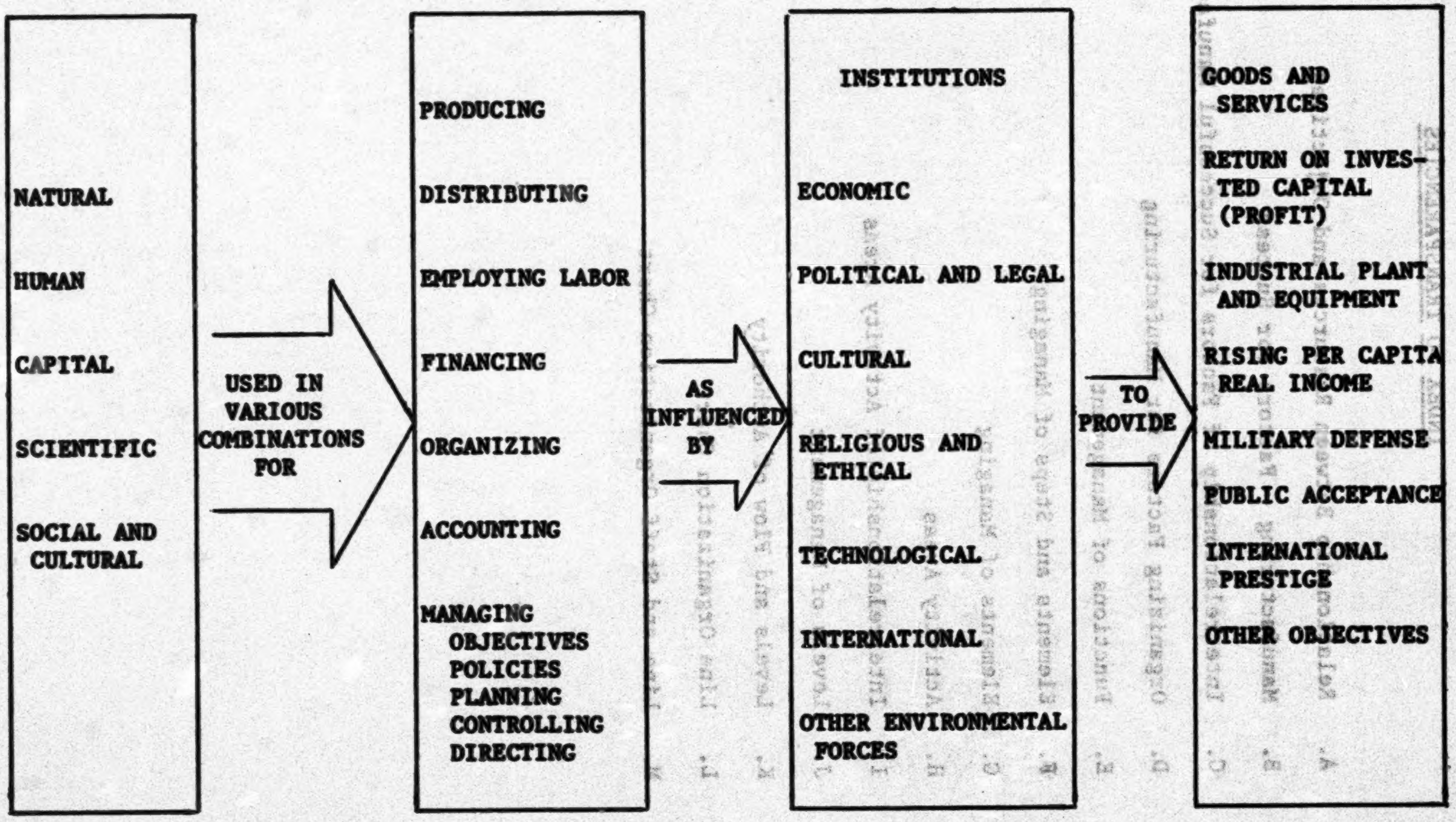
J. Levels of Management

K. Levels and Flow of Authority

L. Line Organization Chart

M. Line and Staff Organization Chart

RELATIONSHIP BETWEEN RESOURCES AND OBJECTIVES



NATURAL

HUMAN

CAPITAL

SCIENTIFIC

SOCIAL AND CULTURAL

USED IN VARIOUS COMBINATIONS FOR

PRODUCING

DISTRIBUTING

EMPLOYING LABOR

FINANCING

ORGANIZING

ACCOUNTING

MANAGING
  OBJECTIVES
  POLICIES
  PLANNING
  CONTROLLING
  DIRECTING

AS INFLUENCED BY

INSTITUTIONS

ECONOMIC

POLITICAL AND LEGAL

CULTURAL

RELIGIOUS AND ETHICAL

TECHNOLOGICAL

INTERNATIONAL

OTHER ENVIRONMENTAL FORCES

TO PROVIDE

GOODS AND SERVICES

RETURN ON INVESTED CAPITAL (PROFIT)

INDUSTRIAL PLANT AND EQUIPMENT

RISING PER CAPITA REAL INCOME

MILITARY DEFENSE

PUBLIC ACCEPTANCE

INTERNATIONAL PRESTIGE

OTHER OBJECTIVES

WHEELER, BUSINESS: AN INTRODUCTORY ANALYSIS, P. 29.

A

MANUFACTURING - FACTORS FOR SUCCESS

MONEY: A PREREQUISITE TO A MANUFACTURING OPERATION. NECESSARY TO PROVIDE THE PLANT AND EQUIPMENT, TO PURCHASE RAW MATERIALS, AND TO MEET PAYROLLS UNTIL SUCH A TIME THAT THERE IS INCOME FROM THE SALE OF PRODUCTS.

MACHINES: INCLUDES ALL PRODUCTION FACILITIES SUCH AS BUILDINGS, TOOLS, EQUIPMENT, AS WELL AS MACHINES IN THE STRICT SENSE. THESE ARE THE TOOLS OF PRODUCTION.

MATERIALS: THOSE THINGS THAT BECOME A PART OF THE FINISHED PRODUCT OFFERED FOR SALE OR THAT ARE USED IN THE MANUFACTURE OF THAT PRODUCT.

MEN: THOSE PEOPLE IN THE MANUFACTURING CONCERN WHO USE THE MACHINES AND MATERIALS PROVIDED TO MAKE THE PRODUCT.

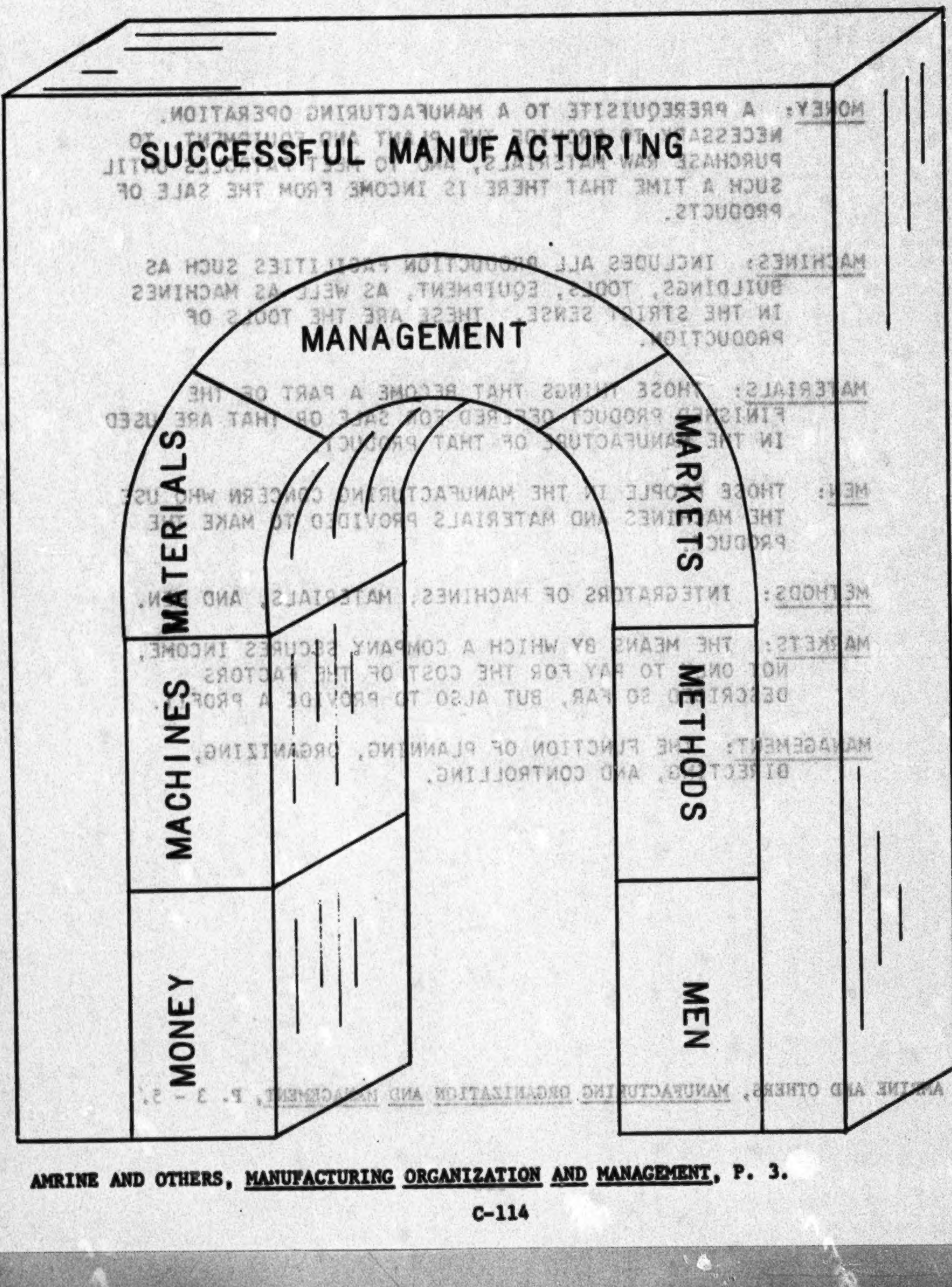
METHODS: INTEGRATORS OF MACHINES, MATERIALS, AND MEN.

MARKETS: THE MEANS BY WHICH A COMPANY SECURES INCOME, NOT ONLY TO PAY FOR THE COST OF THE FACTORS DESCRIBED SO FAR, BUT ALSO TO PROVIDE A PROFIT.

MANAGEMENT: THE FUNCTION OF PLANNING, ORGANIZING, DIRECTING, AND CONTROLLING.

AMRINE AND OTHERS, MANUFACTURING ORGANIZATION AND MANAGEMENT, P. 3 - 5.

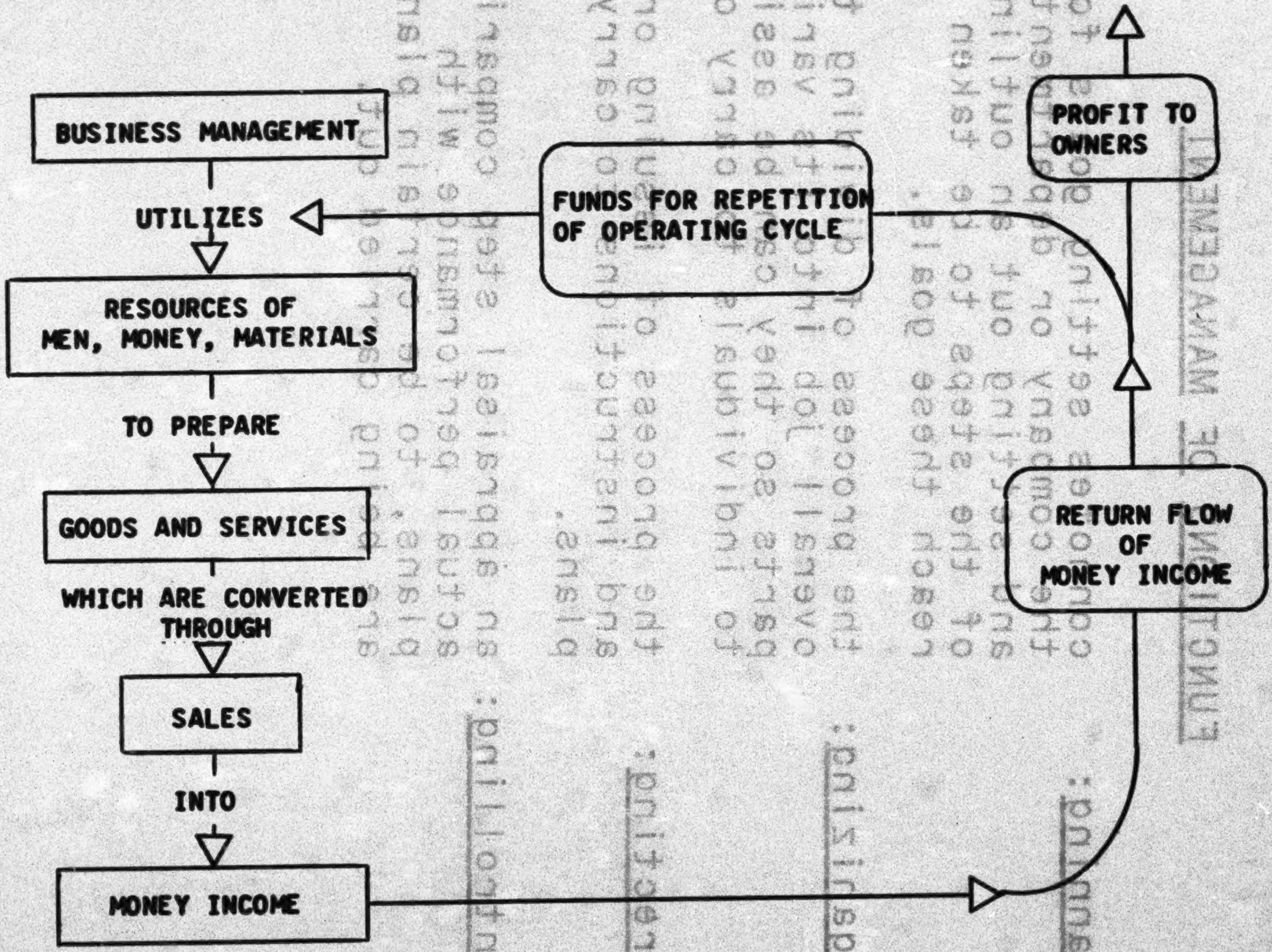
INTER-RELATIONSHIP OF FACTORS FOR SUCCESSFUL MANUFACTURE


SUCCESSFUL MANUFACTURING
MANAGEMENT
MATERIALS
MARKETS
MACHINES
METHODS
MONEY
MEN

AMRINE AND OTHERS, MANUFACTURING ORGANIZATION AND MANAGEMENT, P. 3.

D

ORGANIZING FACTORS FOR MANUFACTURING


BUSINESS MANAGEMENT
UTILIZES
RESOURCES OF MEN, MONEY, MATERIALS
TO PREPARE
GOODS AND SERVICES
WHICH ARE CONVERTED THROUGH
SALES
INTO
MONEY INCOME
RETURN FLOW OF MONEY INCOME
PROFIT TO OWNERS
FUNDS FOR REPETITION OF OPERATING CYCLE

WHEELER, BUSINESS: AN INTRODUCTORY ANALYSIS, P. 97.

E

FUNCTIONS OF MANAGEMENT

Planning: connotes setting goals for the company or department and setting out an outline of the steps to be taken to reach these goals.

Organizing: the process of dividing the overall job into its various parts so they can be assigned to individuals to carry out.

Directing: the process of issuing orders and instructions to carry out plans.

Controlling: an appraisal step comparing actual performance with plans, to be certain plans are being carried out.

AMRINE AND OTHERS, MANUFACTURING ORGANIZATION AND MANAGEMENT, P. 5.

ELEMENTS AND STEPS OF MANAGING

F

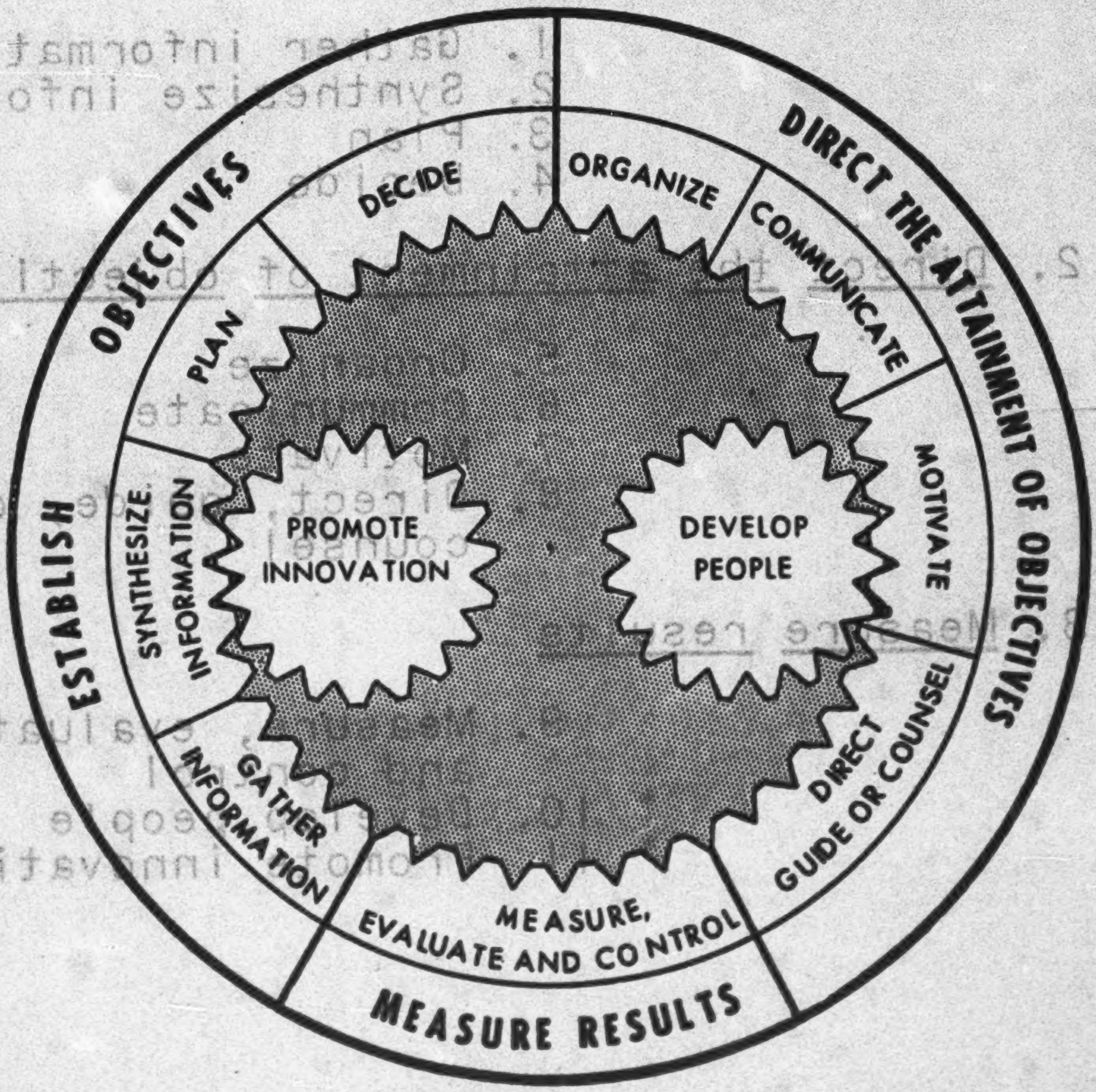
Three steps of Managing

Eleven elements of Managing

1. Establish objectives
    1. Gather information
    2. Synthesize information
    3. Plan
    4. Decide
2. Direct the attainment of objectives
    5. Organize
    6. Communicate
    7. Motivate
    8. Direct, guide, or counsel
3. Measure results
    9. Measure, evaluate, and control
    * 10. Develop people
    * 11. Promote innovation

ACME, COMMON BODY OF KNOWLEDGE REQUIRED BY PROFESSIONAL MANAGEMENT CONSULTANTS, P. 14 - 15.

ELEMENTS OF MANAGING


ESTABLISH OBJECTIVES
DIRECT THE ATTAINMENT OF OBJECTIVES
MEASURE RESULTS
DECIDE
ORGANIZE
COMMUNICATE
PLAN
MOTIVATE
SYNTHESIZE INFORMATION
PROMOTE INNOVATION
DEVELOP PEOPLE
GATHER INFORMATION
DIRECT GUIDE OR COUNSEL
MEASURE, EVALUATE AND CONTROL

ACME, COMMON BODY OF KNOWLEDGE REQUIRED BY PROFESSIONAL MANAGEMENT CONSULTANTS, CHART IX.

ACTIVITY AREAS

H

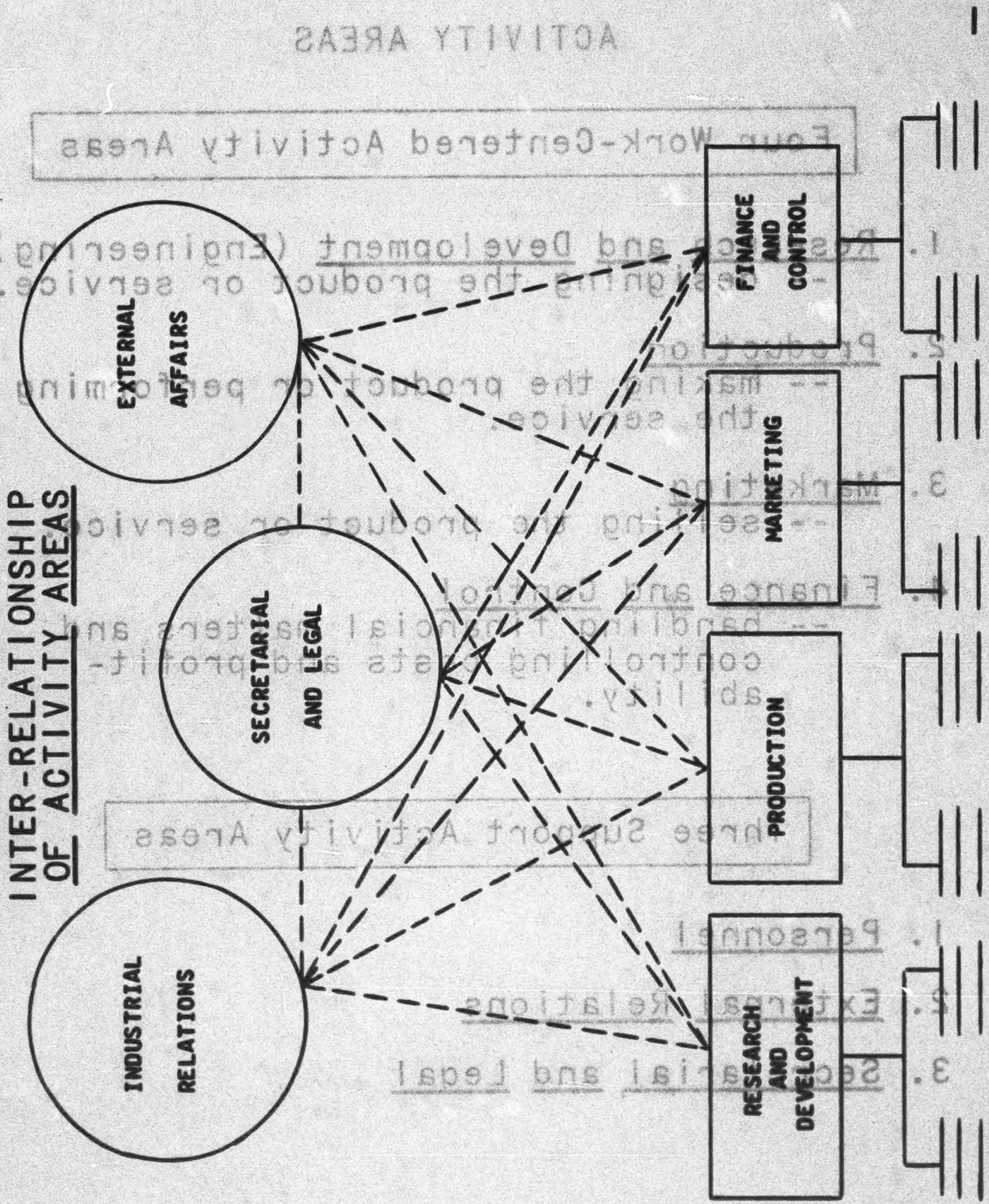
Four Work-Centered Activity Areas

1. Research and Development (Engineering)
   -- designing the product or service.
2. Production
   -- making the product or performing the service.
3. Marketing
   -- selling the product or service.
4. Finance and Control
   -- handling financial matters and controlling costs and profitability.

Three Support Activity Areas

1. Personnel
2. External Relations
3. Secretarial and Legal

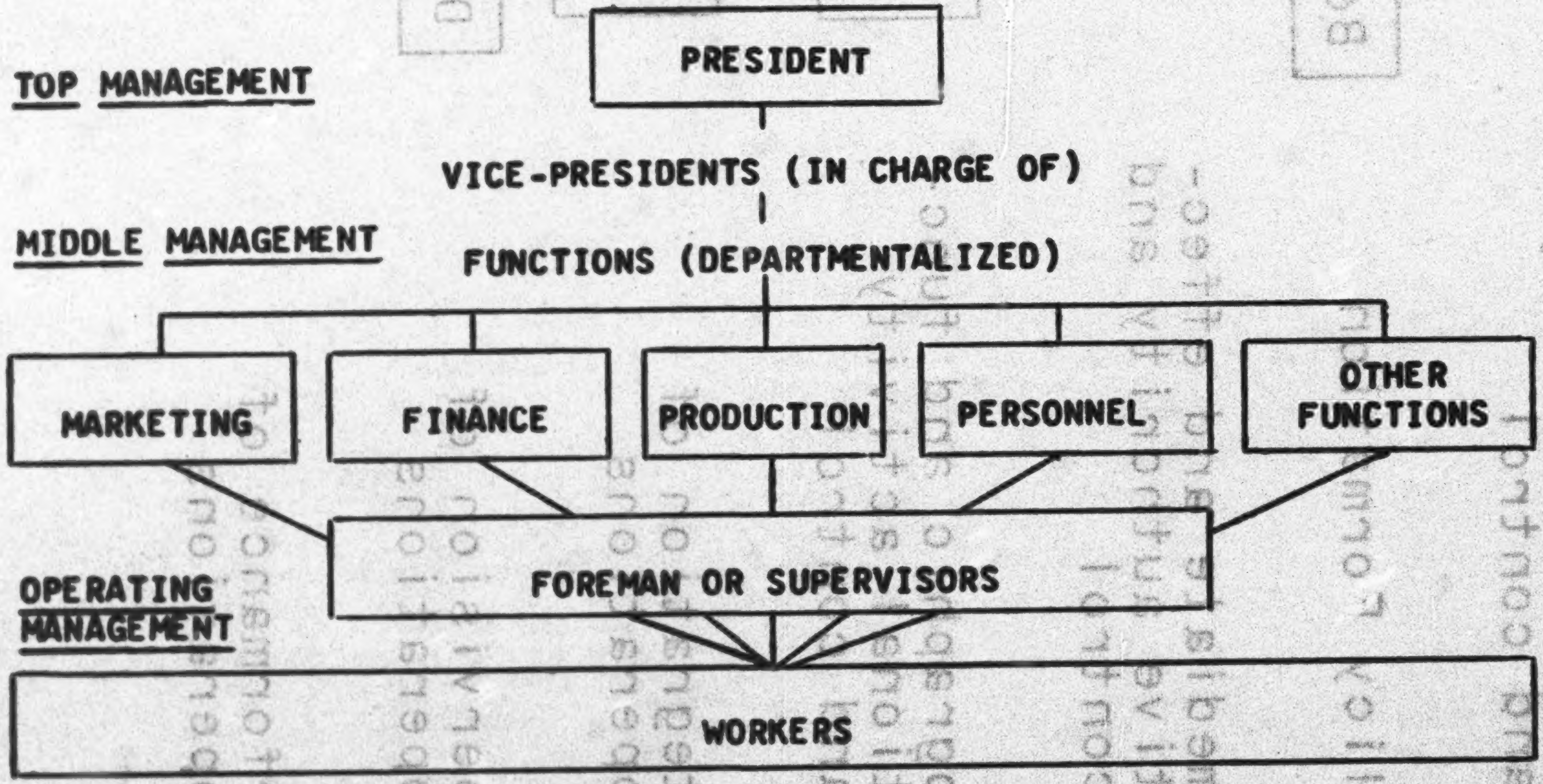
ACME, COMMON BODY OF KNOWLEDGE REQUIRED BY PROFESSIONAL MANAGEMENT CONSULTANTS, CHART I.


INTER-RELATIONSHIP OF ACTIVITY AREAS
EXTERNAL AFFAIRS
SECRETARIAL AND LEGAL
INDUSTRIAL RELATIONS
FINANCE AND CONTROL
MARKETING
PRODUCTION
RESEARCH AND DEVELOPMENT

ACME, COMMON BODY OF KNOWLEDGE REQUIRED BY PROFESSIONAL MANAGEMENT CONSULTANTS, CHART I.

J

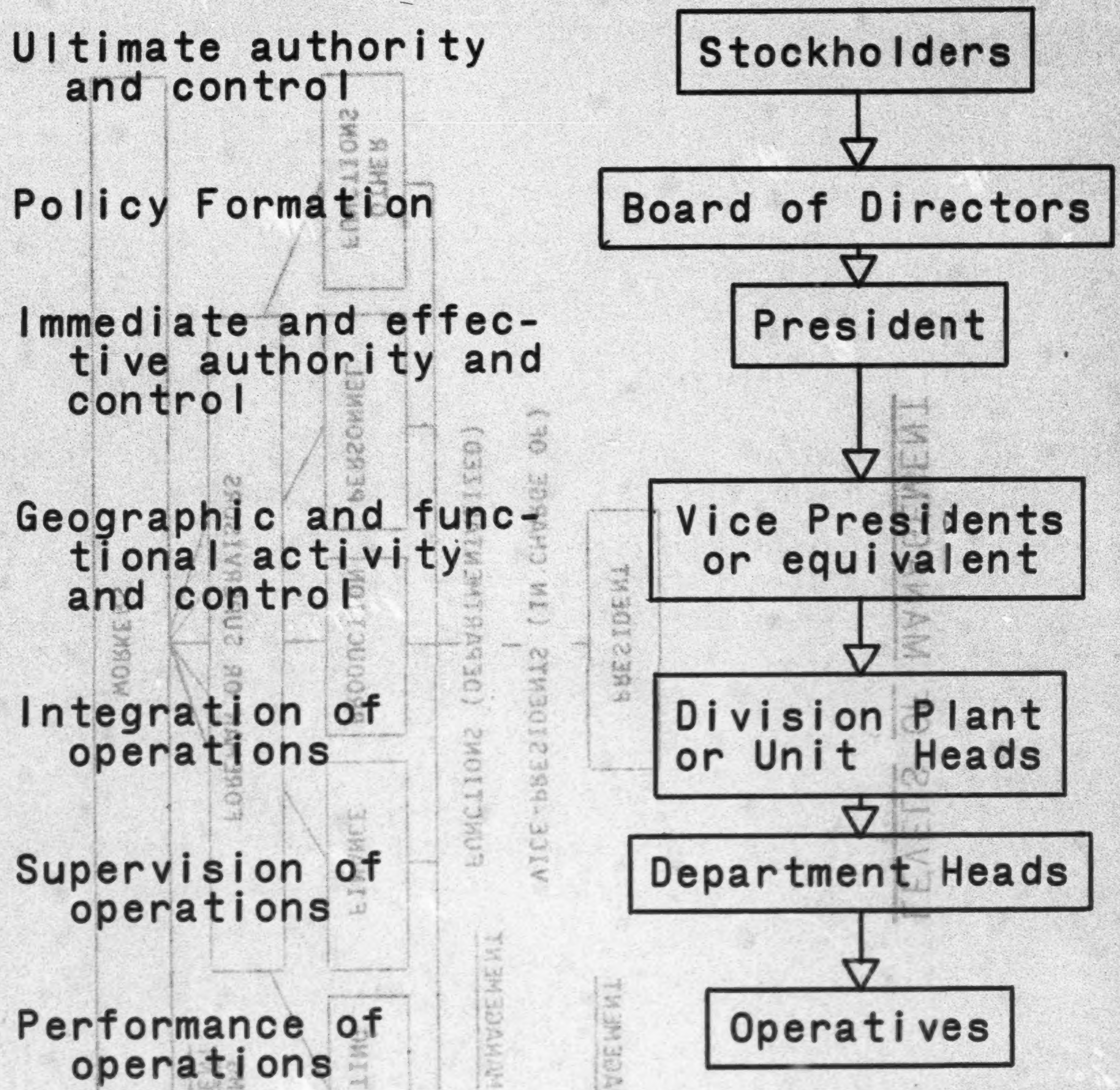
LEVELS OF MANAGEMENT


TOP MANAGEMENT
PRESIDENT
VICE-PRESIDENTS (IN CHARGE OF)
MIDDLE MANAGEMENT
FUNCTIONS (DEPARTMENTALIZED)
MARKETING
FINANCE
PRODUCTION
PERSONNEL
OTHER FUNCTIONS
OPERATING MANAGEMENT
FOREMAN OR SUPERVISORS
WORKERS

WHEELER, BUSINESS: AN INTRODUCTORY ANALYSIS, P. 142.

LEVELS AND FLOW OF AUTHORITY

K

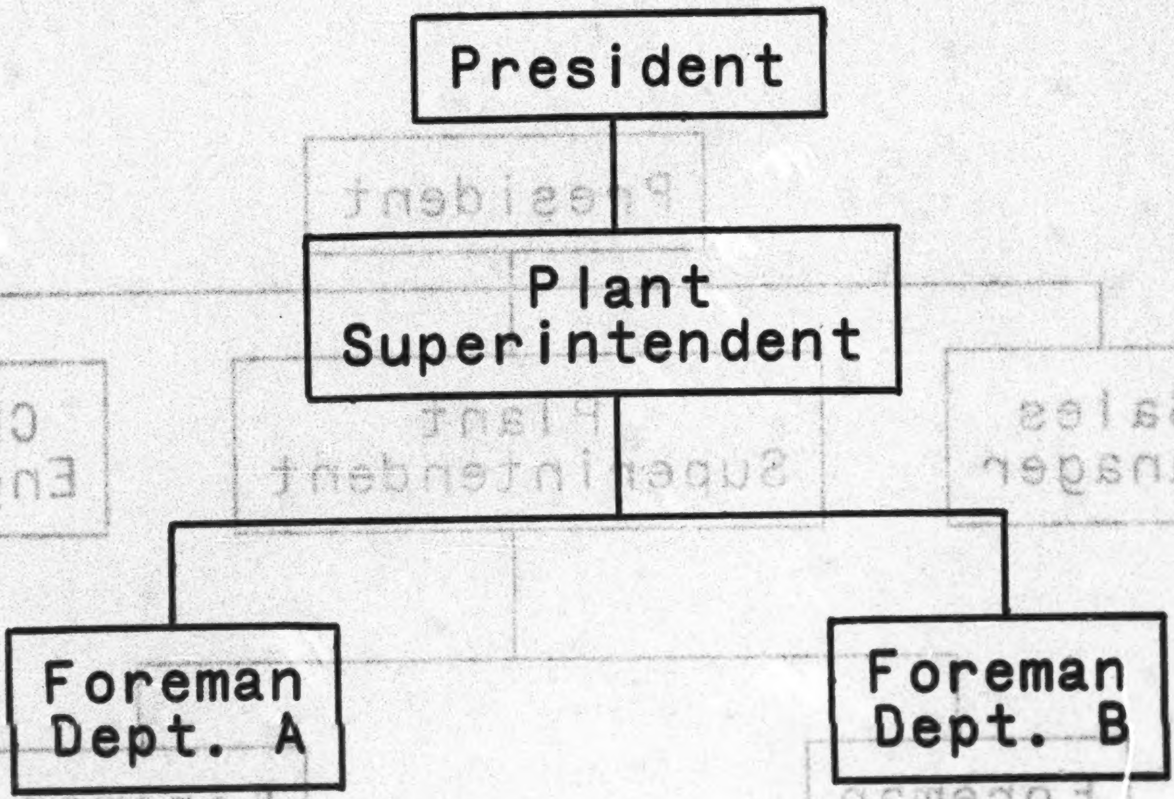


Ultimate authority and control	Stockholders
Policy Formation	Board of Directors
Immediate and effective authority and control	President
Geographic and functional activity and control	Vice Presidents or equivalent
Integration of operations	Division Plant or Unit Heads
Supervision of operations	Department Heads
Performance of operations	Operatives

WHEELER, BUSINESS: AN INTRODUCTORY ANALYSIS, P. 144.

L

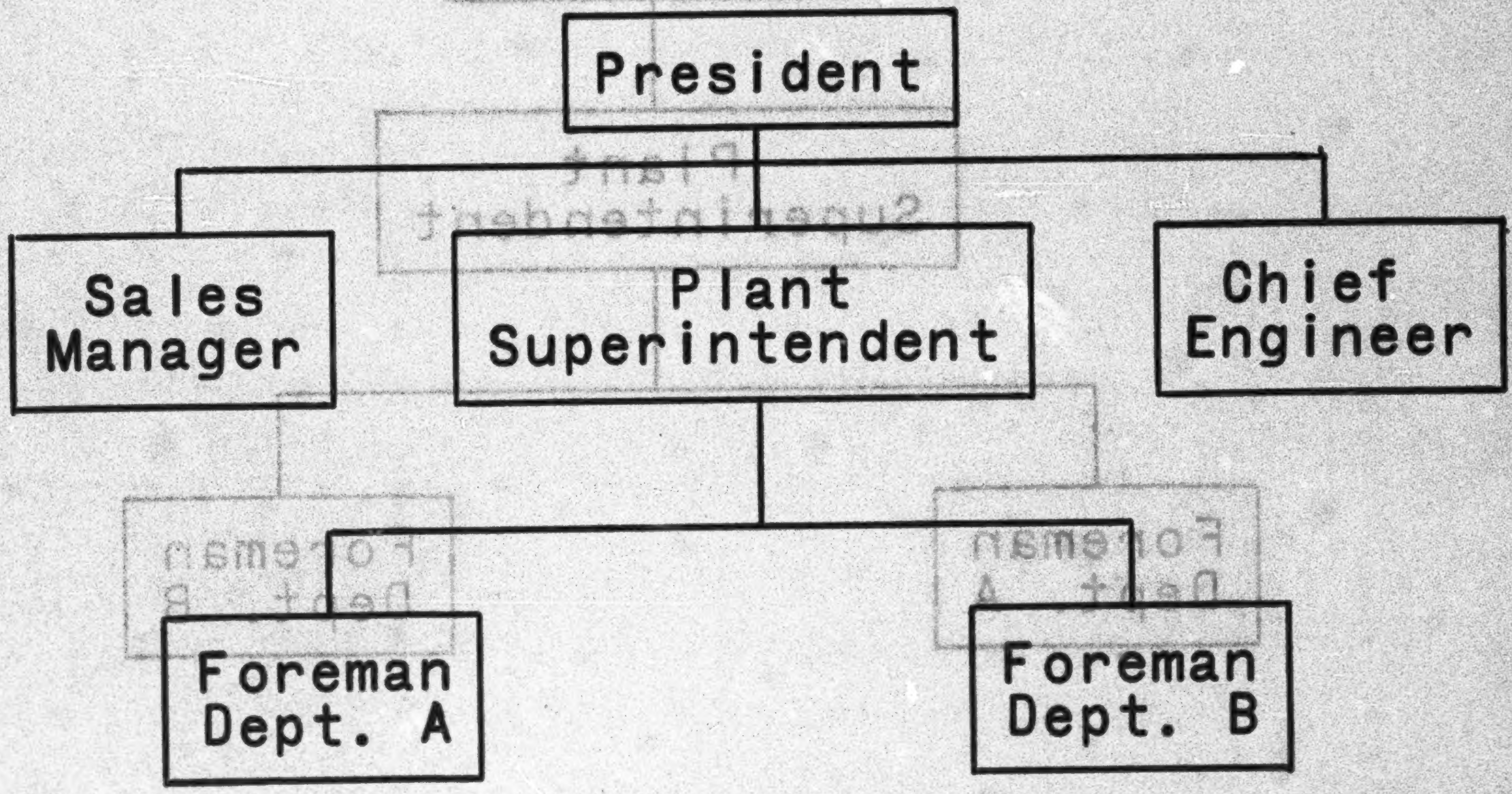
LINE ORGANIZATION


President
Plant Superintendent
Foreman Dept. A
Foreman Dept. B

AMRINE AND OTHERS, MANUFACTURING ORGANIZATION AND MANAGEMENT, P. 54.

M

LINE AND STAFF ORGANIZATION


President
Sales Manager
Plant Superintendent
Chief Engineer
Foreman Dept. A
Foreman Dept. B

AMRINE AND OTHERS, MANUFACTURING ORGANIZATION AND MANAGEMENT, P. 55.

CONCEPTS - BASIS FOR CURRICULUM DEVELOPMENT

(Seminar Unit - 11)

I. Introduction

The experiences you will have and the observations which you make during your field study experience in industry will be most valuable to you in acquiring certain concepts about industry in our society you would not have been able to obtain any other way. These concepts should form the foundation for your thinking in developing a workable curriculum plan for your own use in teaching.

II. Field Study Experience as Basis for Curriculum Development

- A. Curriculum - a total educational experience
  - 1. Course outlines
  - 2. Units
  - 3. Lessons
  - 4. Developmental activities

III. Function of Curriculum (11:Ch.II)

- A. Transmit the culture
- B. Enable student to understand society
- C. Develop conceptual structure

IV. Rapid Changes in Industrial Society Past Few Years (8:Ch.II)

- A. More leisure time
- B. Increased complexity
- C. Automation of industry
- D. Vast research and development effort (2:5)
  - 1. New products and processes
  - 2. Means of production

- E. Need to re-examine emphasis in education (Quote #1)

V. Identification of Structure for Content (4:31) (Quote #2)

- A. Need to identify basic structure (Quote #3)
- B. Key concepts as basis for structure (Quote #4)
  - 1. Complexity of knowledge
  - 2. Economy of learning effort
  - 3. Provide means of relating individual items

- C. Other areas of curriculum developing new structure based on concepts (1:4-6)
  - 1. Mathematics
  - 2. Science - MIT Studies
  - 3. Social Studies - Syracuse
  - 4. Industrial Arts - Study of American Industry - Stout
  - 5. Development of a structure of related concepts essential (Quote #5) (Quote #6)

D. Analysis of 39 State Curriculum Guides reflects inadequacies (10:34)
    1. Lack of consistency
    2. Incomplete structure to interpret industry (Quote #7)

VI. What Is A Concept?

A. Definition (12:84) (A)
    1. Depends on purpose for which formed

B. General meaning (B)
    1. A relatively complete and meaningful idea
    2. An understanding of something
    3. Giving meaning to perceived experience
    4. A mental image
    5. A synthesis of conclusions drawn from experience with a particular situation (thing)

C. A conceptual statement (C)
    1. Are concepts the same as principles? (D)

D. Consists of the identification of major elements of subject to be studied.

VII. Advantages of Concepts - Categorizing (3:13) (E)

A. Reduces complexity of environment (Quote #8)
B. Provides means of identification
C. Categorizing reduces need for constant learning
D. Provides direction for instrumental activity
E. Permits ordering and relating classes of events

VIII. How Concepts are Formed (13:Ch.V)

A. Facts contribute to formulation of concepts
    1. Teacher must guide and select experiences (F) (G)

B. Facts are not concepts
    Fact + F + F (synthesis) = Concept
    Example: size, material, design = plan

C. Concept should be applicable to number of different situations
    F + F + F --- (S) = C)
    F + F + F --- (S) = C) Conceptual Scheme
    F + F --- (S) = C)
    Example: Industrial Relations - scheme - management

D. As ends and means
    Use minor concepts to develop hierarchy of concepts
    #1 Example 1. Strength of materials
    2. Appearance of object

    #2 Example (major) Interchangeability of parts
    (minor) Tolerance dimensioning
    (minor) Accuracy

IX. How Concepts are Stated (wording is not the primary concern) (14:2-3)

A. Statements should represent general concept to be developed
B. Structuring of Concept Statements
C. Written statement which conveys general meaning
(See example 1)

FORM A

$$\text{When}\left\{\begin{array}{l}\text{this}\\ \text{or}\\ \text{these}\end{array}\right\}\left\{\begin{array}{l}\left.\begin{array}{l}\text{event(s)}\\ \text{process(es)}\\ \text{behavior(s)}\end{array}\right\}\text{occur(s)}\\ \left.\begin{array}{l}\text{circumstance(s)}\\ \text{quality(ies)}\\ \text{structure(s)}\end{array}\right\}\text{exist(s)}\end{array}\right.\left\{\begin{array}{l}\text{it}\\ \text{they}\end{array}\right.\begin{array}{l}\text{will}\\ \text{tend}\\ \text{to}\\ \text{pro-}\\ \text{duce}\end{array}\left\{\begin{array}{l}\text{this result}\\ \text{or}\\ \text{these feelings}\\ \text{or}\\ \text{these conditions}\\ \text{or}\\ \text{these reactions.}\end{array}\right.$$

FORM B

$$\text{This}\left\{\begin{array}{l}\text{object}\\ \text{process}\\ \text{quality}\\ \text{idea}\\ \text{condition}\\ \text{place}\\ \text{organization}\\ \text{etc.}\end{array}\right\}\text{has these elements}\left\{\begin{array}{l}\text{height}\\ \text{depth}\\ \text{width}\\ \text{number}\\ \text{substance}\\ \text{motion}\\ \text{time units}\\ \text{etc.}\end{array}\right\}\text{in this}\left\{\begin{array}{l}\text{form}\\ \text{structure}\\ \text{configuration.}\end{array}\right.$$

X. Need for Developing Conceptual Framework for Studying Industry

A. Oswego Research Project (H)
B. Stout State Plan (I)

Industrial Relations
Production
Marketing
Materials
Processes
Communication

Financial Control
Physical Facilities
Research and Development
Engineering
Labor
Transportation

XI. Student Needs to Learn Simple Concrete Facts to Develop Concepts (6:24) (Quote #9)

XII. Development of Curriculum Resource Unit Based on Concepts (1:4-6)

A. Choice of concept to be developed (J)
B. Lessons and activities derived
C. Identify resources

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CONCEPTS - BASIS FOR CURRICULUM DEVELOPMENT

EXAMPLES

INDUSTRIAL RELATIONS

1. Individuals who apply for jobs according to prescribed and established procedures are more likely to be successful in acquiring the job than those who do not follow said procedures.

2. Workers attitude, cooperation, ability to accept and adapt to change, willingness and ability to work with others are key ingredients for occupational success.

PRODUCTION

1. The use of proper scheduling procedures is important to insure good production principles.

2. Quality control cuts waste to a predetermined minimum.

ENGINEERING

1. When a company utilizes industrial research and development to develop new and better products and processes and better ways of producing and using old products, it is better able to compete with others.

2. When standards are established in engineering, unnecessary duplication and repetition will be minimized.

LABOR

1. A grievance procedure is needed to determine the worth of a grievance and to allow for individual recognition.

2. Although a company has no union, its employees are affected by working conditions in neighboring companies which may or may not be unionized.

MARKETING

1. Advertising agency plays an important role in corporation development.

2. When a company furnishes a wide variety of products in the same field, distributors are encouraged to handle all products of the company.

Quote #1

For example the new curricula in the physical and social sciences specifically list as their objectives the student's discovery of concepts and generalizations and the development of "thinking processes", "independent learning skills" and "creativity". The same type of objective is now essential in the field of vocational training. Within a very few years all routine tasks outside the home will be done by machines, and adults who have not been helped to attain the conceptual skills and the attitudes of initiative and responsibility required for technical, managerial, or professional work will be economically dispossessed unable to participate in productive work.

Snygg, Donald W., "Learning Theory for Curricular Change", Using Current Curriculum Developments, ASCD, 1963, p. 109.

Quote #2

In commenting upon some of the new curriculum developments being carried on in various disciplines:

"Curriculum planning in the various subjects has usually focused on what is 'basic'. Yet courses of study, textbooks, and teaching practices have all too frequently made multitudinous background facts, principles and processes so 'basic' as to limit or inhibit the learner's full understanding of underlying structures or concepts which should persist in his approach to the subject. Many of the current projects make the few really central concepts, not the diverse background items, the point of focus. In some projects, the emphasis is on the learner's discovery and formation of these concepts for himself."

"Curriculum workers generally would welcome curriculum designs and instructional materials which cut through masses of uninviting detail to concentrate on significant, persistent themes and principles. The problem has been both to define such basic materials and to have them studied in such ways as to become the intellectual possession of pupils. The great investment made in the national projects and the cooperative effort involving representatives of the disciplines and the schools may well be producing better-defined and better-learned concepts as well as insights into their continuing definition and learning."

Alexander, Changing Curriculum Content, p. 4 - 6.

Quote #3

Designing curricula in a way that reflects the basic structure of a field of knowledge requires the most fundamental understanding of that field.

Bruner, Process of Education, p. 32.

Quote #4

Phenix, a noted educational philosopher states:

Not only is knowledge available in abundance, but the requirements of modern life place a premium on mastering it. A highly complex industrial society can endure only if it is cared for by persons of technical competence and social wisdom.

A solution to the problem is outlined in the following statement:

By a careful analysis of the structure of knowledge it is possible to discover certain key concepts distinguished by their power to epitomize important common features of a large number of more particular ideas. Such concepts are basic central ideas, an understanding of which opens the door to an effective grasp of an entire field of knowledge. These key ideas provide, as it were, a map whereby the whole scheme of a subject may be grasped and characteristic features of individual items of knowledge may for the first time be rightly interpreted. . . . . .

Teachers ought above all to know the basic rationale of their disciplines and should conduct their instruction in the light of these essential principles. This does not mean that the key concepts should be taught explicitly and directly, at least to beginners. It does mean that particular items of knowledge should be selected and used with an eye to their exemplification of the basic concepts of the field.

Phenix, "Key Concepts and the Crisis in Learning", p. 137 - 143.

Quote #5

The importance of identifying concepts to be learned in a field such as science is reflected in the following statement:

Each area of science, they say, is essentially a structure of interrelated concepts which organize and give significance to the separate facts and thus make possible the deduction of new ones. Isolated facts, without a theory to unify them, do not tell us what to expect in new situations and consequently do not equip the student for success in any but routine situations where other people have already worked out the answers.

ASCD, New Curriculum Development, p.6.

Quote #6

In keeping with the stress on intellectual outcomes, there is a clear-cut trend to select content from disciplines and to organize it around key concepts, themes and generalizations. . . . .

It is generally assumed that content should be organized logically around a cohesive set of ideas that can be used to generate continuing learning. Efforts are being made to structure content in patterns that facilitate growth in the student's ability to use concepts and key ideas in analyzing issues, formulating hypotheses or questions, recalling relevant information, relating one idea to another, organizing new information and discovering relationships.

ASCD, New Curriculum Developments, p. 71.

Quote #7

What the student does in an industrial arts laboratory ought to be related to the significant technological problems such as; mass production, improvement of product design, research and development, new machines and processes, uses of new materials, labor utilization, management, automation, safety, and communication.

These topics each represent a sub concept that needs to be understood.

Schmitt, Analysis of Thirty-Nine Curriculum Guides, p. 69.

Quote #8

Suggests that the development of concepts involves the categorizing of instances events and that this process is fundamentally underlying the development of concept.

Achievements of categorizing:

1. Reduces the complexity of environment.
2. Provides means by which objects of the world are identified.
3. Categorizing reduces the necessity for constant learning.
4. Provides direction for instrumental activity.
5. Permits the ordering and relating classes of events.

Bruner, J. S., et al, A Study of Thinking, p. 12 - 13.

Quote #9

Desirable concepts about industry, when fully developed, are abstract, complex, and widely applicable. But the junior high school student, because he has had little relevant prior experience, is ill prepared to understand them in their most useful, but abstract, form. He first requires some laboratory experiences in order to acquire percepts and simple, concrete concepts of tangible things and forces. These simple, concrete concepts can then be used as the foundation for building meaningful, abstract concepts. Therefore, judicious use of laboratories is an important aspect of effective instruction at the junior high school level. It is necessary to carefully select the first-hand experiences to be provided in the laboratory so that the simple, concrete concepts which are developed will be the key blocks essential to later abstract concept development.

Moss and Stadt, "A Framework for Industrial Arts Curriculum Redevelopment in the Secondary Schools", Journal of Industrial Teacher Education, Vol. 3:2, Winter 1966, p. 24.

A

CONCEPTS - BASIS FOR CURRICULUM DEVELOPMENT

INDEX TO TRANSPARENCIES

A. Definition of a Concept
B. What Is A Concept?
To Teach A Concept
C. A Conceptual Statement
D. Definition of a Principle
E. Why Concepts are Important
F. Concept Forming Process
G. Role of Teacher in Concept Formation
H. Concept of Common Elements of Industry
I. Industrial Arts Approaches
J. Concept Projection - Plans

DEFINITION OF CONCEPT

A CONCEPT IS A RELATIVELY COMPLETE AND MEANINGFUL IDEA IN THE MIND OF A PERSON. IT IS AN UNDERSTANDING OF SOMETHING. IT IS HIS OWN SUBJECTIVE PRODUCT OF HIS WAY OF MAKING MEANING OF THINGS HE HAS SEEN OR OTHERWISE PERCEIVED IN HIS EXPERIENCES. AT ITS MOST CONCRETE LEVEL IT IS LIKELY TO BE A MENTAL IMAGE OF SOME ACTUAL OBJECT OR EVENT THE PERSON HAS SEEN. AT ITS MOST ABSTRACT AND COMPLEX LEVEL IT IS A SYNTHESIS OF A NUMBER OF CONCLUSIONS HE HAS DRAWN ABOUT HIS EXPERIENCE WITH PARTICULAR THINGS.

Woodruff, A., "Use of Concepts in Teaching and Learning", Journal Teacher Education, March 1964, p. 84.

B

WHAT IS A CONCEPT?

1. A RELATIVELY COMPLETE AND MEANINGFUL IDEA.
2. AN UNDERSTANDING OF SOMETHING.
3. GIVING MEANING TO A PERCEIVED EXPERIENCE.
4. A MENTAL IMAGE.
5. A SYNTHESIS OF CONCLUSIONS DRAWN FROM EXPERIENCES WITH A PARTICULAR THING OR SITUATION.

TO TEACH A NEW CONCEPT YOU MUST HAVE THREE THINGS

1. PREVIOUS EXPERIENCE OR CONCEPT
2. A REACTION TO THE MATERIAL PRESENTED
3. ACTIVE PARTICIPATION

EXAMPLES: MANAGEMENT
PURCHASING
QUALITY CONTROL

A CONCEPTUAL STATEMENT

C

A DESCRIPTION OF THE PROPERTIES OF A PROCESS, STRUCTURE OR QUALITY, STATED IN A FORM WHICH INDICATES WHAT HAS TO BE DEMONSTRATED OR PORTRAYED SO A LEARNER CAN PERCEIVE THE PROCESS, STRUCTURE OR QUALITY FOR HIMSELF.

Woodruff, A., "Use of Concepts in Teaching and Learning", Journal Teacher Education, March 1964, p. 85.

D

DEFINITION OF A PRINCIPLE

1. A SOURCE OR CAUSE FROM WHICH A THING PROCEEDS - A POWER THAT ACTS CONTINUOUSLY - A GENERAL GUIDE TO ACTION.
2. A GENERAL TRUTH OR PROPOSITION THAT WHICH IS ASSUMED OR HELD AS FUNDAMENTAL IN ANY SYSTEM OR CHAIN OF REASONING.
3. A LAW OF NATURE AS ILLUSTRATED IN THE MECHANICAL POWERS - A LAW OF MECHANICS UNDER WHICH A GIVEN MECHANISM ACCOMPLISHES A CERTAIN RESULT.

E

WHY CONCEPTS ARE IMPORTANT

1. CONCEPTS REDUCE THE COMPLEXITY OF THE ENVIRONMENT.

2. PROVIDE A MEANS BY WHICH THE STRUCTURE OF THE ENVIRONMENT MAY BE IDENTIFIED.

3. REDUCES THE NEED FOR RELEARNING AT EACH NEW ENCOUNTER. (ISOLATED FACTS FIT INTO A PATTERN - CATEGORIZING)

4. AID IN PROVIDING DIRECTION - PLANNING.

5. PERMIT ORDERING AND RELATING CLASS OF OBJECTS -- EVENTS.

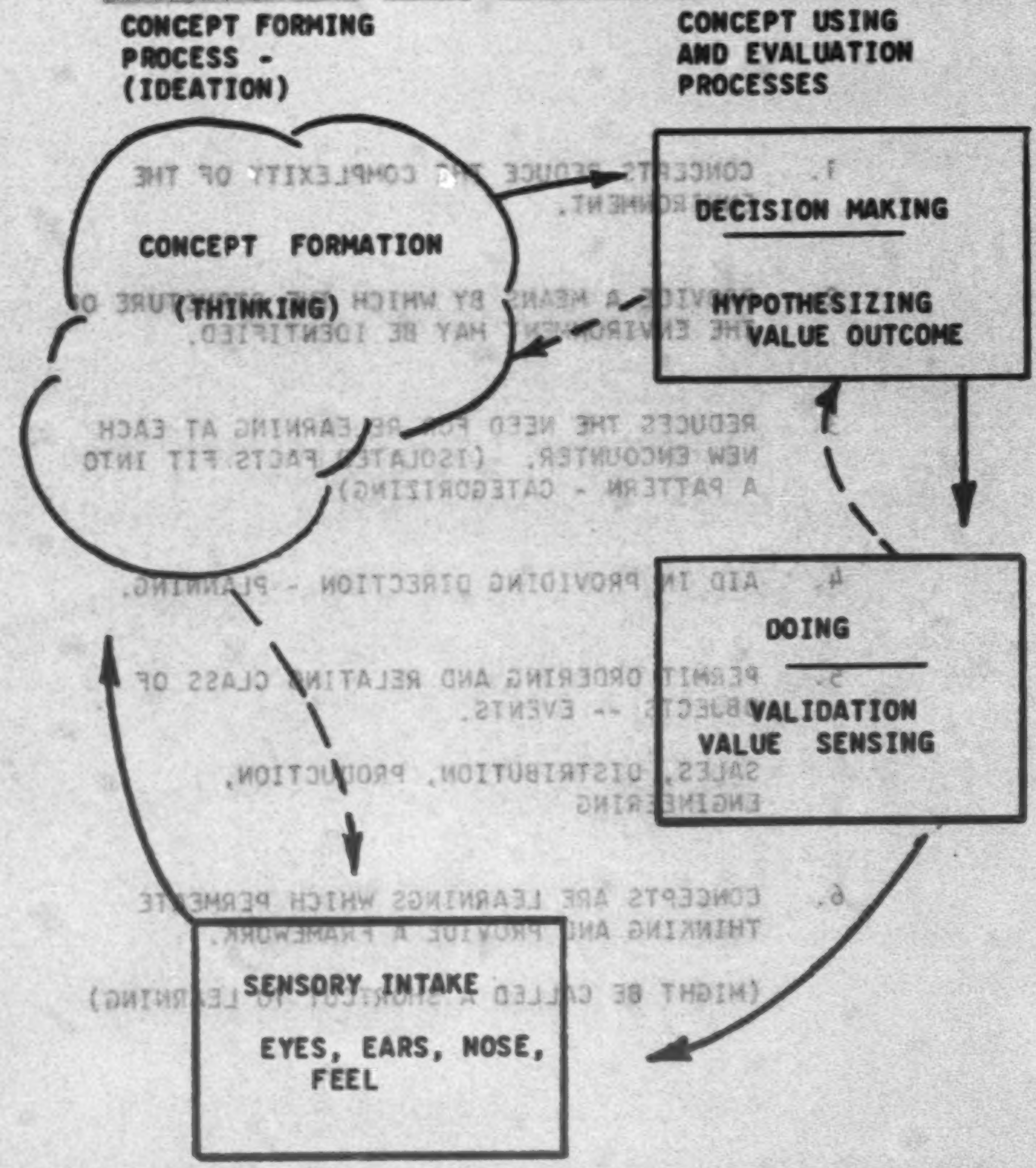
   SALES, DISTRIBUTION, PRODUCTION, ENGINEERING

6. CONCEPTS ARE LEARNINGS WHICH PERMEATE THINKING AND PROVIDE A FRAMEWORK.

   (MIGHT BE CALLED A SHORTCUT TO LEARNING)

Bruner and Goodnow, et al, A Study of Thinking, p. 13.

F

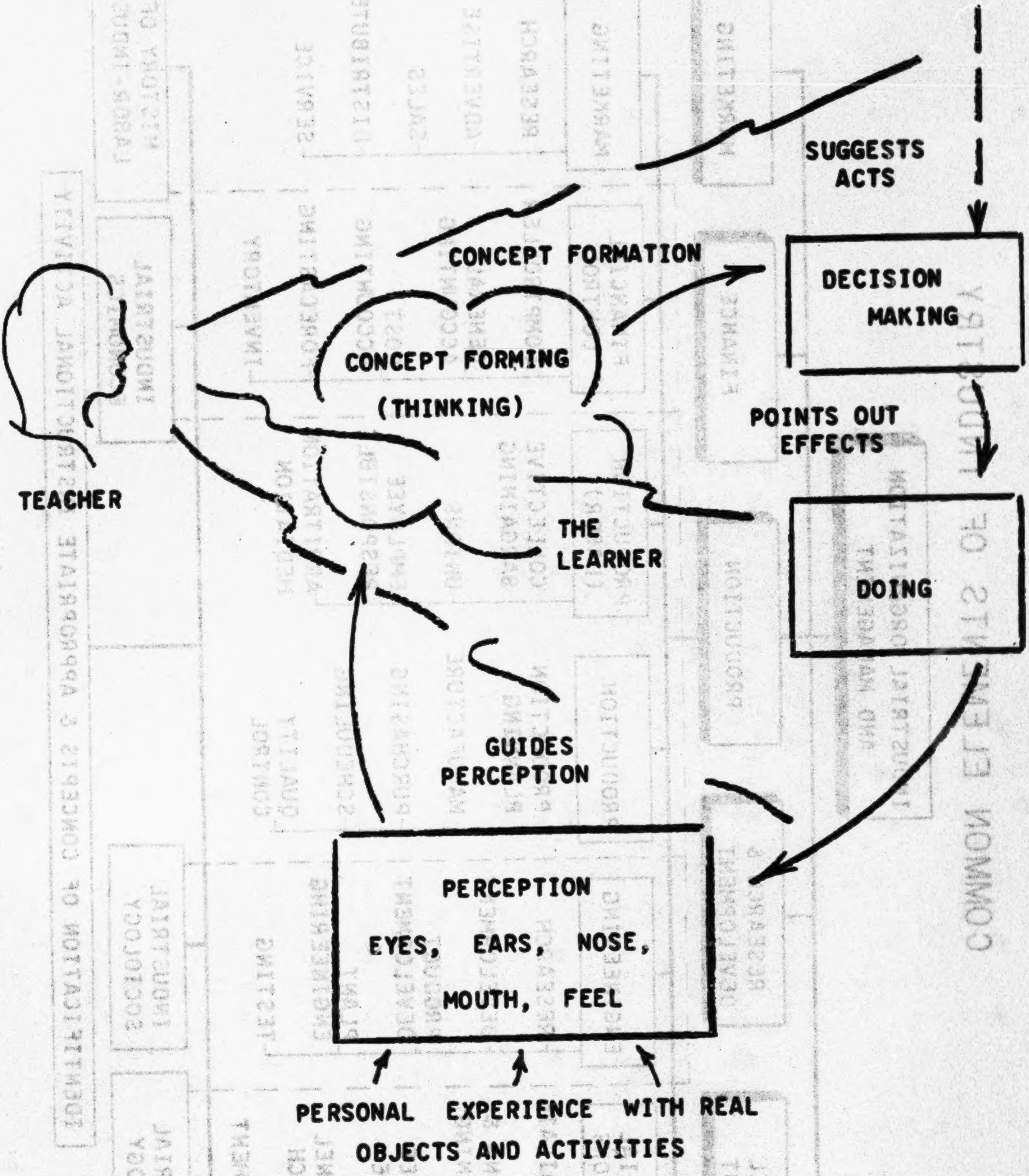

CONCEPT FORMING PROCESS - (IDEATION)
CONCEPT USING AND EVALUATION PROCESSES
CONCEPT FORMATION
(THINKING)
DECISION MAKING
HYPOTHESIZING
VALUE OUTCOME
DOING
VALIDATION
VALUE SENSING
SENSORY INTAKE
EYES, EARS, NOSE, FEEL

CYCLE IN CONCEPTUAL LEARNING AND BEHAVIOR

Woodruff, A., "The Use of Concepts in Teaching and Learning", p. 87.

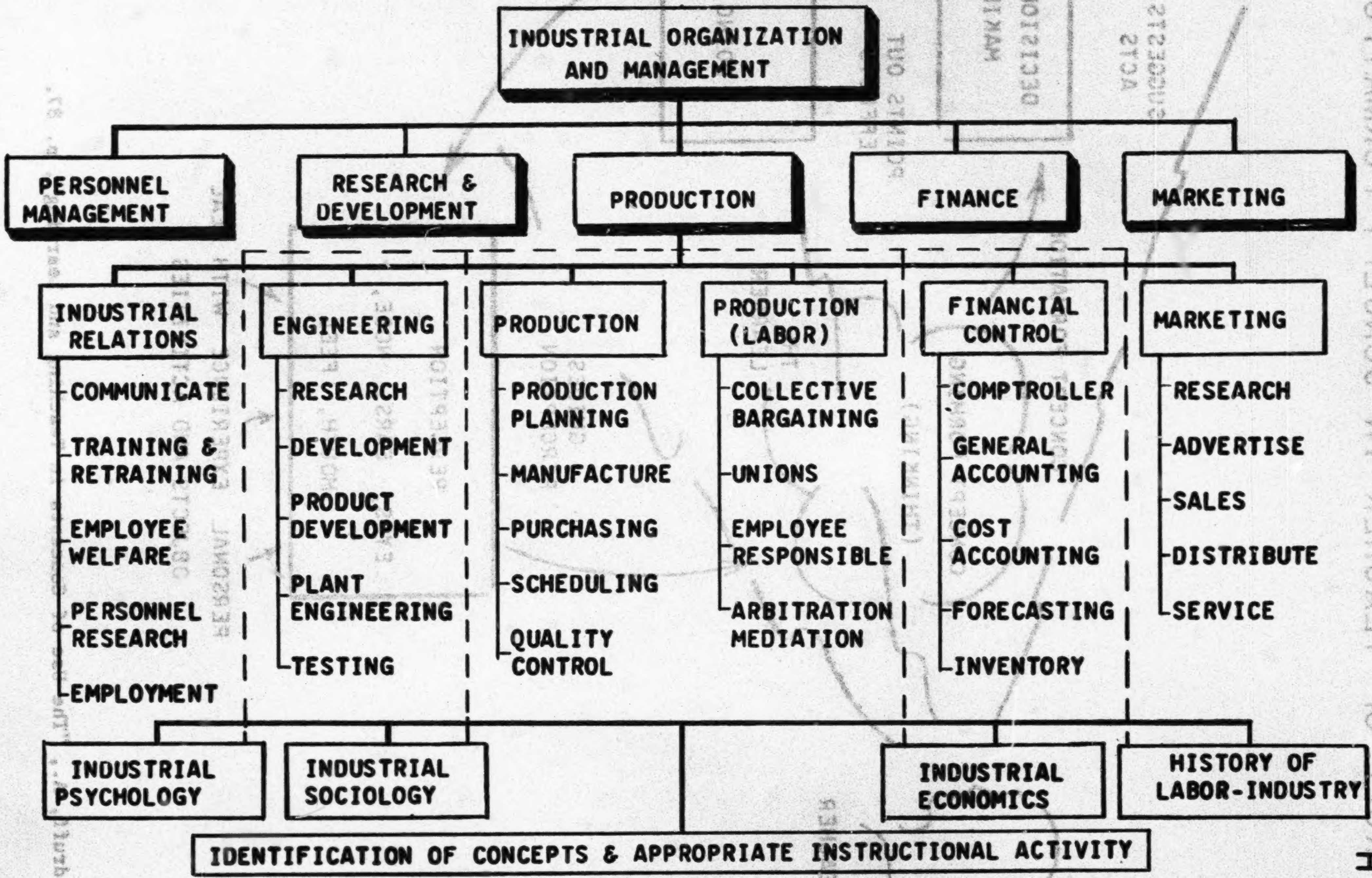
G

ROLE OF TEACHER IN CONCEPT FORMATION


SUGGESTS ACTS
CONCEPT FORMATION
DECISION MAKING
CONCEPT FORMING
(THINKING)
TEACHER
POINTS OUT EFFECTS
THE LEARNER
DOING
GUIDES PERCEPTION
PERCEPTION
EYES, EARS, NOSE,
MOUTH, FEEL
PERSONAL EXPERIENCE WITH REAL OBJECTS AND ACTIVITIES

Woodruff, A., "The Use of Concepts in Teaching and Learning", p. 87.

COMMON ELEMENTS OF INDUSTRY


INDUSTRIAL ORGANIZATION AND MANAGEMENT
PERSONNEL MANAGEMENT
RESEARCH & DEVELOPMENT
PRODUCTION
FINANCE
MARKETING
INDUSTRIAL RELATIONS
COMMUNICATE
TRAINING & RETRAINING
EMPLOYEE WELFARE
PERSONNEL RESEARCH
EMPLOYMENT
ENGINEERING
RESEARCH
DEVELOPMENT
PRODUCT DEVELOPMENT
PLANT ENGINEERING
TESTING
PRODUCTION
PRODUCTION PLANNING
MANUFACTURE
PURCHASING
SCHEDULING
QUALITY CONTROL
PRODUCTION (LABOR)
COLLECTIVE BARGAINING
UNIONS
EMPLOYEE RESPONSIBLE
ARBITRATION MEDIATION
FINANCIAL CONTROL
COMPTROLLER
GENERAL ACCOUNTING
COST ACCOUNTING
FORECASTING
INVENTORY
MARKETING
RESEARCH
ADVERTISE
SALES
DISTRIBUTE
SERVICE
INDUSTRIAL PSYCHOLOGY
INDUSTRIAL SOCIOLOGY
INDUSTRIAL ECONOMICS
HISTORY OF LABOR-INDUSTRY
IDENTIFICATION OF CONCEPTS & APPROPRIATE INSTRUCTIONAL ACTIVITY

H

INDUSTRIAL ARTS APPROACHES

	TRADITIONAL	CONCEPTUAL
1.	DETAILED KNOWLEDGE PRE-VOCATIONAL OR AVOCATIONAL	COVERS TOTAL INSTITUTION OF INDUSTRY FOR GENERAL EDUCATION.
2.	COVERS SPECIFIC INDUSTRIES - MATERIALS NOT STANDARDIZED	STUDY OF CONCEPTS IS EASIER TO ORGANIZE AND LENDS ITSELF TO STANDARDIZATION.
3.	PRESELECTED SKILLS TO REPRESENT INDUSTRY - JOB PERFORMANCE BREAKDOWN	SKILLS SERVE ONLY TO AID IN THE UNDERSTANDING OF INDUSTRIAL CONCEPTS.
4.	ATTEMPTS TO DUPLICATE INDUSTRY	MERELY UTILIZES THOSE FACILITIES NECESSARY TO DEVELOP CONCEPTS.

INDUSTRIAL ARTS SHOULD BECOME CONCERNED PRIMARILY WITH THE DEVELOPMENT OF CONCEPTS AND PRINCIPLES OF INDUSTRY.

CONCEPTS AND PRINCIPLES ARE MORE UNIVERSAL AND TRANSFERABLE TO MANY SITUATIONS AND INDUSTRIES.

Face, W. L. and Flug, E. Z., "A Conceptual Approach to the Study of American Industry", AVA Journal, p. 17.

CONCEPT PROJECTION - PLANS

CONCEPT	FACTS & PRINCIPLES	LESSON	ACTIVITIES
IMPORTANCE OF INDIVIDUAL WORKER IN INDUSTRY	QUALIFICATIONS FOR JOB	JOB OPPORTUNITIES IN FIELD	WRITE LETTER OF APPLICATION
	HOW WORKERS ARE EMPLOYED	JOB QUALIFICATIONS	CONDUCT INTERVIEWS FOR M.P. JOBS
	PERSONNEL DEPARTMENT DETERMINES NEEDS	OBTAINING A POSITION	RATE WORKER ON JOB
		WORKER ATTITUDE ON JOB	
		RESOURCES	
		FILM	
		DICT. OCCUP. TITLES	

INDUSTRIAL RELATIONS
(Seminar Unit - 12)

I. Introduction

The area of Industrial Relations is presented to acquaint the students with the many broad functions and contributions of this important management operation. The responsibilities of this department are involved with all aspects of human factors as they relate to the employer, employee, and community. More specifically, this department is responsible for securing capable employees for all areas of work within the company, improving their productivity, providing for adequate compensation and general welfare, communications, public relations, and effectively and efficiently organizing the company. (Quote #1)

II. Organization

A. Functions (A) (2:378-394)
   1. Employment
   2. Wage and salary administration
   3. Employee relations
   4. Organization planning and development
   5. Employee services

B. Sub-functions (B) (3:281-300)
   1. Employment
      a. Recruitment
      b. Selection
      c. Indoctrination
      d. Promotion

   2. Wage and Salary Administration (1:393-406)
      a. Employee classification
      b. Rate determination
      c. Merit ratings
      d. Supplemental compensation
      e. Work schedule control

   3. Personnel or Employee Relations
      a. Communications (4:163-168)
      b. Collective bargaining
      c. Employee discipline
      d. Personnel research

   4. Organization Planning and Development
      a. Organization planning
      b. Manpower development
      c. Training (1:346-350)

   5. Employee services (1:351-360)
      a. Medical services
      b. Recreation
      c. Personal services
      d. Safety
      e. Protection and security

III. Descriptions of Functions

- A. Employment
  - 1. Insuring that all positions are filled by competent personnel at reasonable cost
  - 2. Secure an effective labor force (1:341-346)
    - a. Develop labor supply
    - b. Job specification
    - c. Appraise applications
    - d. Employee testing
    - e. Screen applicants
    - f. Induct and follow-up
    - g. Make transfers and promotions
    - h. Control absenteeism and tardiness
    - i. Control turn-over
  - 3. Employment procedure (C)
    - a. Notification of need for employees
      - (1) Requisition for employees (Example #1)
      - (2) Differences for additional and replacement employees
      - (3) Source(s) of requisition
    - b. Reception of applications
      - (1) Sources of labor
        - (a) within company
        - (b) unsolicited applicants
        - (c) employment agencies
        - (d) schools
        - (e) advertising
    - c. Preliminary interview (3:285-287)
      - (1) Purposes
    - d. Application blank (D) (2:406)
      - (1) Purpose and information requested
      - (2) Types
        - (a) production, etc.
        - (b) office
        - (c) sales
        - (d) executive
      - (3) Differences among types
    - e. Employment tests
      - (1) Types
        - (a) intelligence (Example 2)
        - (b) trade
        - (c) aptitude
        - (d) psychological
      - (2) Purposes
      - (3) Weaknesses (Quote #2)
    - f. Follow-up interview
      - (1) Purpose
      - (2) Guide for interview

- g. Investigation of previous history
- h. Preliminary selection in employment department
- i. Final selection by foreman or supervisor
- j. Physical examination
- k. Placement

4. Indoctrination (Example #3)
    - a. At personnel office (Example #4)
        - (1) Employee benefits
        - (2) Other procedures
        - (3) Safety

    - b. In department
        - (1) Introductions
        - (2) Job requirements
        - (3) Other information

5. Evaluation of employment procedure
    - a. Reduces
        - (1) Turnover
        - (2) Hiring and training expense
        - (3) Production losses by new employees

B. Wage and Salary Administration

1. Insuring that all employees are fairly and equitably compensated
    - a. Developing sound wage and salary system (4:176-178) (3:323-330)
        - (1) Clarify objective of system
        - (2) Formulate policies
        - (3) Delegate responsibility
        - (4) Apply procedure

2. Activities of Wage and Salary Function (E)
    - a. Wage policy (3:315-321)
        - (1) Factors considered (Quote #3)
            - (a) internal factors
            - (b) external factors

    - b. Job analysis (1:410)
        - (1) Finding the facts about jobs
        - (2) Purpose
            - (a) identification of job
            - (b) duties
            - (c) responsibilities
            - (d) working conditions
            - (e) personal qualifications
        - (3) Results (F)
            - (a) job description

    - c. Job rating (1:410-418)
        - (1) Establishing hierarchy among jobs
        - (2) Methods (Quote #4)
            - (a) ranking
            - (b) job classification (civil service)
            - (c) factor comparison
            - (d) point systems (G)

d. Job pricing (1:418-420)
  (1) Originate pay schedule
  (2) Based on wage policy
  (3) Influenced by company-union agreements in unionized plant

e. Merit rating (1:422-425)
  (1) Definition (Quote #5)
  (2) Methods used
    (a) supervisor and management employees
      - performance appraisal
      - evaluation report
      - development review
    (b) non-supervisory employees
      - merit rating
      - performance review
  (3) Values of merit rating
    (a) basis for pay increases
    (b) basis for promotion, etc.
    (c) checks hiring program
    (d) promotes morale
    (e) guides self-improvement

f. Task setting
  (1) Standards for performance
  (2) Methods (to be discussed later units)
    (a) time study
    (b) standard times

g. Wage control (1:393-406)
  (1) Methods of payment (Quote #6)
    (a) performance of duties
      - day rate
      - day rate and merit rating
    (b) performance of units of work
      - piece rates
      - incentive plans
  (2) Overtime
    (a) exempt
      - salary
      - no overtime
    (b) non-exempt
      - salary or hourly
      - receive overtime

C. Employee Relations (3:356-367)
  1. Insuring management-employee relationships are positive
  2. Collective bargaining
    a. Steps
      (1) Recognize bargaining unit
      (2) Bargain in good faith
      (3) Meet proposals
      (4) Prepare agreement (Example #5)
    b. Concerns of employees

3. Communications
    a. Value
    b. Informal
        (1) Supervision to worker
        (2) Steward to worker

    c. Formal
        (1) Company newspaper or magazine (Example #6)
        (2) Suggestion system (Example #7)
            (a) purposes (Quote #7)
        (3) Bulletin boards
            (a) job notices
            (b) union notices
            (c) company information
            (d) worker to worker communications
                - want ads
                - sports events
        (4) Grievance procedure (H)
            (a) steps (Quote #8)
                - foreman - steward or employee or both
                - superintendent - chief steward
                - top management - union leadership
                - arbitration

4. Employee discipline (3:294-296)
    a. Infraction of company rules
    b. Notification of action
    c. Record of incident

D. Training and Development (1:346-350)
    1. Establishing training programs
        a. Factors to consider
            (1) Employee background
            (2) Job requirements
            (3) Future developments

    2. Types of training
        a. On-the-job
            (1) Most common
            (2) Given by supervisor or fellow worker

        b. Vestibule
            (1) "Classroom"
            (2) Trained instructor
            (3) For large training operations

        c. Apprentice (Example #8)
            (1) Skilled workers
            (2) Combination of on-the-job and related classroom instruction
            (3) Duration (3-5 years)

E. Safety (3:349-354)
    1. Contents of good safety program
        a. Engineering

b. Education
c. Enlistment
d. Enforcement

2. Safety practices and rules

F. Employee services
1. Medical
2. Insurance
a. Health and accident
b. Life
c. Disability

3. Retirement
4. Stock options
5. Unemployment

A Summary -

1. Functions of industrial relations department (Quote #9)

a. Employment

b. Wage and salary administration

c. Employee relations

d. Organization

e. Employee services

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INDUSTRIAL RELATIONS

EXAMPLES

1. **Employment Requisition.**

   To include the following data:
   - a. department making the request
   - b. number and sex needed
   - c. job title
   - d. job specification
   - e. salary
   - f. date needed
   - g. disposition taken on request by Employment Department

2. **Employment Tests.** (intelligence, dexterity, trade, aptitude, psychological)

3. **Employee Induction Procedure.**

   To include the following data:
   - a. receive and greet the employee
   - b. explain employee welfare program
   - c. physical examination
   - d. photograph and identification badge
   - e. safety department
   - f. introduced to immediate supervisor who greets new employee and explains:
     - 1. time card procedures and specific hours of employment
     - 2. location of washroom, cafeteria, first aid station, etc.
     - 3. safety on the job
     - 4. location of special tools, materials, supplies
     - 5. specifics of job instructions
     - 6. introduces employee to union steward

   - g. review of all of above by supervisor and Employment Department

4. **Employee Benefit Program Materials.**

   To include such items as descriptive literature on such employee benefit programs as:
   - a. medical insurance
   - b. life insurance
   - c. retirement
   - d. profit sharing
   - e. others

5. Labor-Management Agreement (Contract)

   Examples of current or recent contracts between a specific union and company(s) are readily available and would include such items as:
   - a. effective dates of agreement
   - b. parties involved
   - c. union representatives
   - d. hours of employment and overtime
   - e. wages
   - f. wage incentive plans

g. grievance procedure
h. discipline and discharge rules
i. seniority
j. vacations and holidays
k. insurance programs
l. pension plan
m. safety program
n. training programs

6. __Company, Division, or Union Newspaper or Magazine.__

7. __Suggestion System.__

a. example of an application form
b. example of a flow chart to explain how suggestions are reviewed and what specific action is taken

8. __Apprenticeship Training Program Descriptive Literature.__

To include the following information:

a. type of apprenticeship program
b. purposes of program
c. admission requirements
d. quotas
e. selection of applicants
f. training period
g. wage agreement (if any)
h. special tool and equipment requirements and responsibilities
i. recognition upon completion

INDUSTRIAL RELATIONS

QUOTATIONS

Quote #1

Management directs its industrial relations through three closely allied programs. Through public relations it controls and improves company contacts with the public, professional groups, government agencies, and the business community; through labor (or joint) relations, it deals with the problems of union representation, collective bargaining, labor contract negotiations and enforcement, and grievance procedures; through personnel management it aims at increasing labor efficiency by studying and regulating such problems as recruitment, training, safety and health, job evaluation, and wage administration. When these three activities are properly integrated and coordinated, industrial relations are at their most effective level.

Shubin, Business Management, p. 254.

Quote #2

One significant weakness of testing to date is its inability accurately to measure motivation and creativity. A person may have all the necessary intelligence, experience, and personality for the job, but if he lacks the motivation to do it, he will be of little value to the company. For jobs that require creativity and originality, tests are of little assistance.

Strong, The Management of Business, p. 227.

Quote #3

Factors Influencing Policy:

Internal factors:

1. the position of labor cost to the total cost of production
2. types of skills required
3. the extent to which reliance must be put on individual productivity for output
4. suitability of the production process to incentive wage-payment methods
5. rapidity of changes in plant processes and technology that modify job content and the composition of the company working force

External factors:

1. firm's competitive standing and the amount of monopoly control it has
2. its earning capacity and financial position
3. stability of its volume of business and employment of labor
4. business prospects
5. extent of unionization in the firm and industry
6. labor market from which it must recruit workers
7. level of wages in the area and the industry
8. trend in the cost of living
9. government wage and hour laws

Shubin, Business Management, p. 278

Quote #4

Job-to-job comparison or ranking: (old-fashioned way)

Compare the job in its entirety with all other jobs without putting any details of the comparison in writing except the final conclusions.

Job classification: (simpler than job ranking)

Each job has a grade - U. S. Civil Service has 18 grades in general schedule (GS). Simpler than job ranking because new jobs are put in grade with a group of similar jobs which already have established maximums and minimums.

Factor comparison:

Comparisons are made factor-by-factor; all jobs are arranged in order of their possession of such characteristics as skill, effort, responsibility, etc. The points are assigned to each factor, and the factors are then totaled and converted to a money scale.

Point system: (most common method used) (National Metal Trades, etc.)

Point systems presuppose that a descriptive scale can be prepared for each job rating factor. The entire range from the least amount found in a factory to the greatest amount probable is broken into approximately equal degree steps. Definitions are written for each degree. Point values derived from the degree steps are used to group jobs into labor grades or wage groups.

Bethel, Atwater, and Scott, Industrial Organization and Management, pp. 508-509.

Quote #5

Merit rating is a valuable partner for job evaluation. Job evaluation rates what the job is worth in money; merit rating determines how the employee is functioning and whether he should be granted an increase in pay within the rate range.

Henderson and Haas, Industrial Organization and Management Fundamentals, p. 193.

Quote #6

Wage payment plans:

Day rate: oldest and simplest form of wage payment based on straight time and is paid on the hourly, daily, or weekly basis.

Merit rating and the day rate: job rating is the basis for the base rate, but this is modified upward or downward by periodic merit ratings.

Piece rates: a rate is established for each piece turned and the wage is the rate times the number of pieces produced.

Incentive system: many incentive plans but a common one allows for the setting of a standard number of pieces and the worker is paid an incentive for each piece over the standard number.

Bornemann, Fundamentals of Industrial Management, pp. 323-330.

Quote #7

Two basic objectives of a suggestion system:

1. to provide employees with a channel of communication with top management through which they can air their opinions and attitudes without endangering their job security or creating friction with their immediate supervisor.
2. to provide management with a source of information regarding work improvement and employee attitude and morale.

Strong, Management of Business, p. 136.

Quote #8

First Step: Usually provides for an attempt to settle a complaint or grievance by the employee and the lowest level of supervision - usually his foreman, and with or without his shop committeeman.

Second Step: Usually grievance is placed in writing, forming a record of the specific complaint and usually requires an answer in writing from the department superintendent.

Third Step: This may involve top management and union leadership at the plant level.

In a multi-plant operation there may be an additional step appealing to the corporate offices and national union office.

Fourth Step: Arbitration.

Tripp, Labor Problems and Processes, p. 298.

Quote #9

What does a personnel or industrial relations department do?

1. It keeps the personnel records of jobs held by employees, their pay raises, hospitalization and other insurance coverage, suggestions made, vacation schedules, and other details.
2. Personnel, in many companies, conducts the labor contract negotiations and interprets the labor contract to supervisors and helps them live up to it.
3. Personnel handles grievances work--keeping all the records of grievances, grievance meetings, and settlements, and it arranges all grievance meetings.
4. Personnel staffs the organization and helps in planning manpower needs.
5. Personnel administers personnel appraisals and sometimes job evaluation, suggestion systems, and wage administration.
6. Personnel often administers safety and the company hospital and/or dispensory, and oversees receptionists, telephone operators, plant guards, and parking lot operations.
7. Personnel oversees the operation of the cafeteria and helps with the credit union, publishes the company newspaper or magazine and helps organize and put on athletic and social activities.

Moore, Manufacturing Management, pp. 316-318.

INDUSTRIAL RELATIONS

INDEX TO TRANSPARENCIES

A. Functions of Industrial Relations

B. Sub-Functions of Industrial Relations

C. Selection and Employment Procedures

D. Application for Employment

E. Major Activities of Wage and Salary Administrator

F. Job Description

G. Job Rating Point System

H. Grievance Form

A

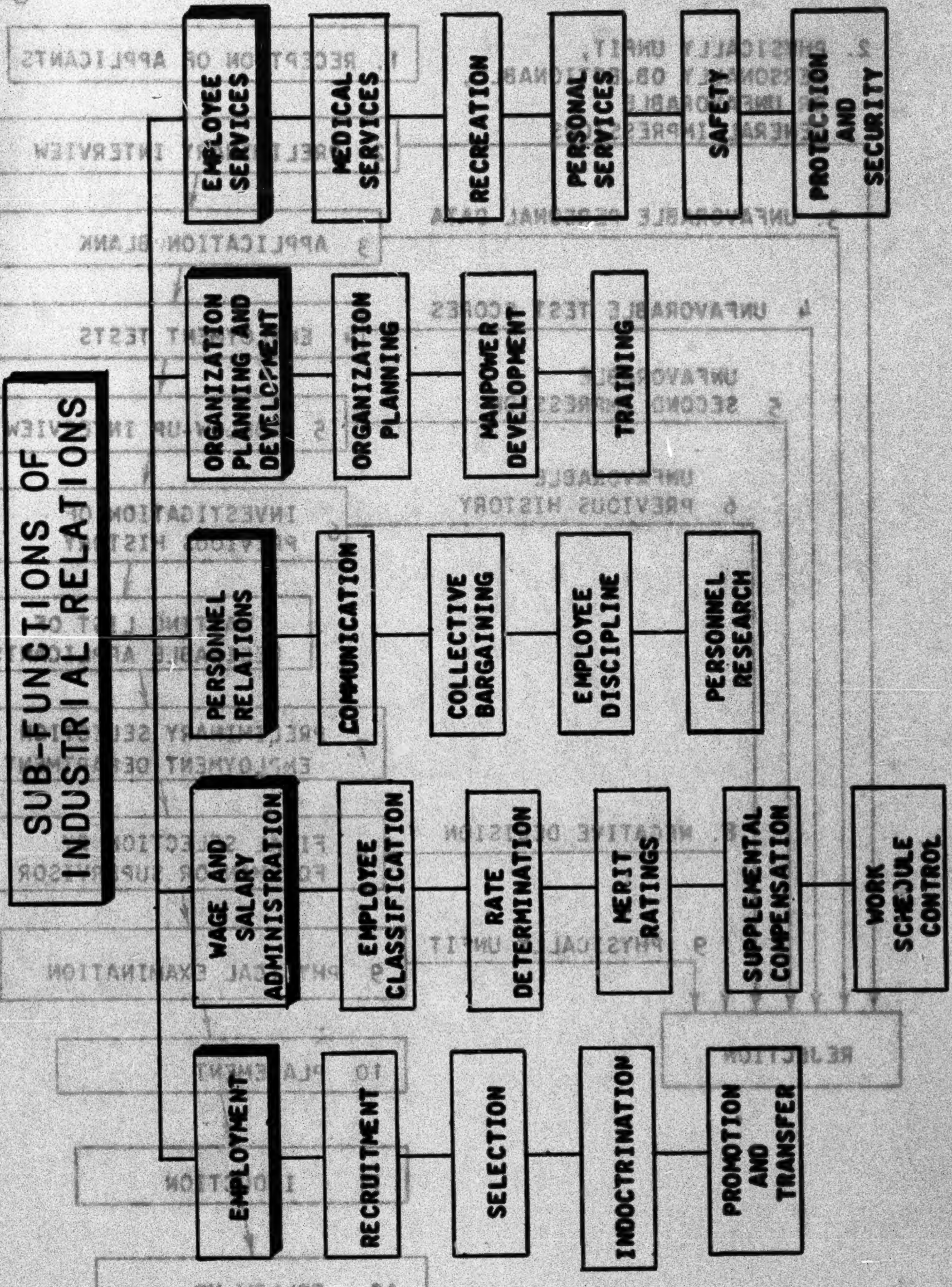
FUNCTIONS OF INDUSTRIAL RELATIONS

DEVELOPING AND ADMINISTERING POLICIES AND PROGRAMS FOR PROVIDING AN EFFECTIVE ORGANIZATIONAL STRUCTURE, SECURING EMPLOYEES, IMPROVING THEIR PRODUCTIVITY, PROVIDING ADEQUATE COMPENSATION AND GENERAL WELFARE, AND PROVIDING AN EFFECTIVE COMMUNICATIONS PROGRAM.

EMPLOYMENT:	INSURING THAT ALL POSITIONS ARE FILLED BY COMPETENT PERSONNEL EFFICIENTLY.
WAGE & SALARY ADMINISTRATION:	INSURING THAT ALL EMPLOYEES ARE FAIRLY AND EQUITABLY COMPENSATED.
EMPLOYEE RELATIONS:	INSURING THAT ALL WORKING RELATIONSHIPS BETWEEN MANAGEMENT AND EMPLOYEES AND THE JOB SATISFACTION OF AND WORK OPPORTUNITIES FOR THE COMPANY'S PERSONNEL ARE DEVELOPED AND MAINTAINED IN THE BEST INTERESTS OF THE COMPANY AND ITS EMPLOYEES.
ORGANIZATION PLANNING AND DEVELOPMENT:	INSURING THAT THE COMPANY IS EFFECTIVELY ORGANIZED AND CAPABLY STAFFED.
EMPLOYEE SERVICES:	MAINTAINING THE GENERAL WELFARE OF EMPLOYEES AND ASSISTING THEM WITH PROBLEMS RELATED TO THEIR SECURITY AND PERSONAL WELL-BEING.

DEVELOPED BY STAFF

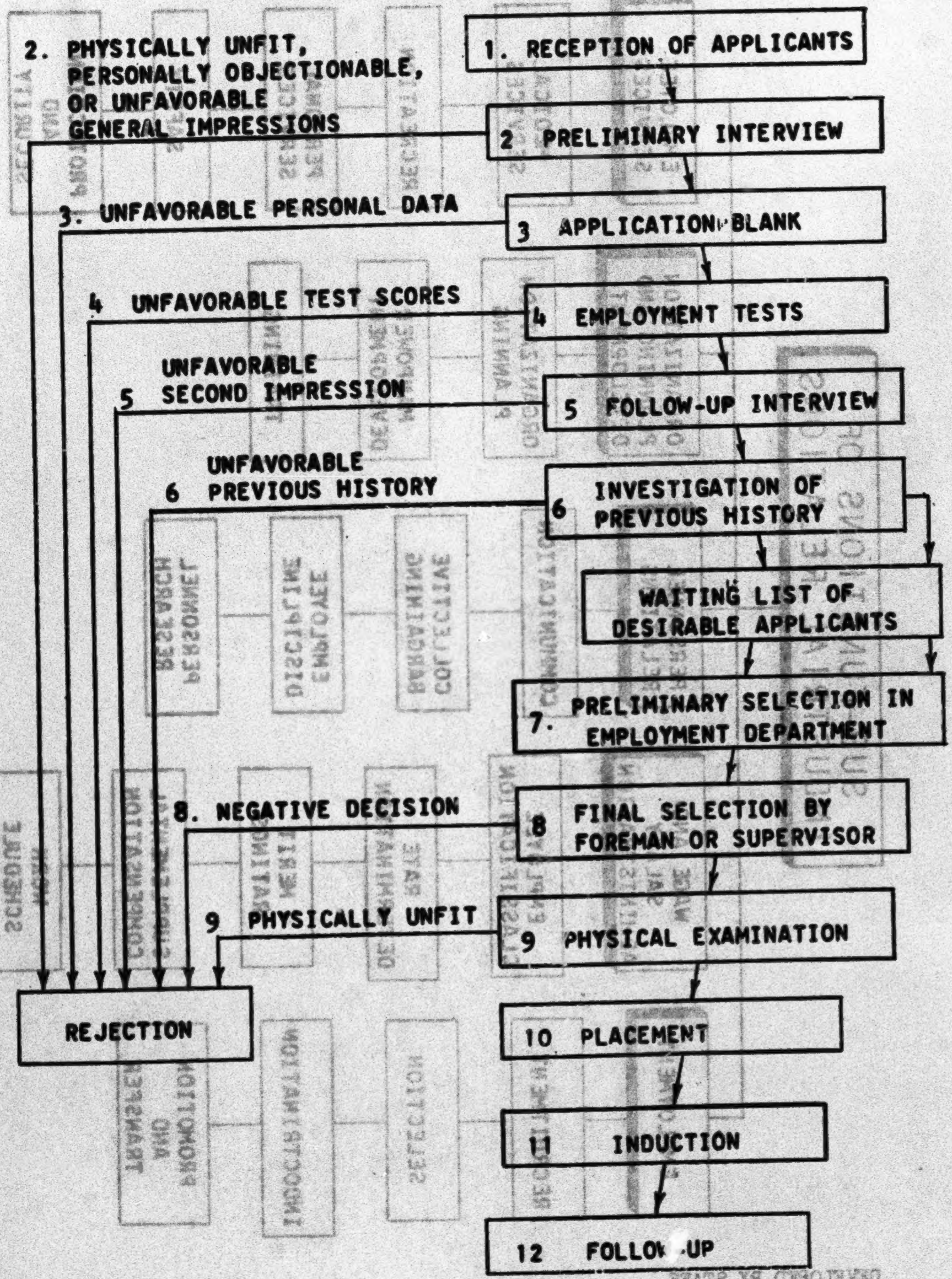
B


SUB-FUNCTIONS OF INDUSTRIAL RELATIONS
EMPLOYEE SERVICES
MEDICAL SERVICES
RECREATION
PERSONAL SERVICES
SAFETY
PROTECTION AND SECURITY
ORGANIZATION PLANNING AND DEVELOPMENT
ORGANIZATION PLANNING
MANPOWER DEVELOPMENT
TRAINING
PERSONNEL RELATIONS
COMMUNICATION
COLLECTIVE BARGAINING
EMPLOYEE DISCIPLINE
PERSONNEL RESEARCH
WAGE AND SALARY ADMINISTRATION
EMPLOYEE CLASSIFICATION
RATE DETERMINATION
MERIT RATINGS
SUPPLEMENTAL COMPENSATION
WORK SCHEDULE CONTROL
EMPLOYMENT
RECRUITMENT
SELECTION
INDOCTRINATION
PROMOTION AND TRANSFER

DEVELOPED BY STAFF

SELECTION and EMPLOYMENT PROCEDURE

C


1. RECEPTION OF APPLICANTS
2 PRELIMINARY INTERVIEW
2. PHYSICALLY UNFIT, PERSONALLY OBJECTIONABLE, OR UNFAVORABLE GENERAL IMPRESSIONS
3 APPLICATION BLANK
3. UNFAVORABLE PERSONAL DATA
4 EMPLOYMENT TESTS
4 UNFAVORABLE TEST SCORES
5 FOLLOW-UP INTERVIEW
5 UNFAVORABLE SECOND IMPRESSION
6 INVESTIGATION OF PREVIOUS HISTORY
6 UNFAVORABLE PREVIOUS HISTORY
WAITING LIST OF DESIRABLE APPLICANTS
7. PRELIMINARY SELECTION IN EMPLOYMENT DEPARTMENT
8 FINAL SELECTION BY FOREMAN OR SUPERVISOR
8. NEGATIVE DECISION
9 PHYSICAL EXAMINATION
9 PHYSICALLY UNFIT
REJECTION
10 PLACEMENT
11 INDUCTION
12 FOLLOW-UP

BETHEL AND OTHERS, INDUSTRIAL ORGANIZATION AND MANAGEMENT, FIG. 19-1, P. 403.

rucible SP 20.11 • REV. 4/65

APPLICATION FOR EMPLOYMENT

CRUCIBLE STEEL COMPANY OF AMERICA

NO.

DATE OF APPLICATION

AME: (LAST) (FIRST) (MIDDLE)
SOCIAL SECURITY NO.
DATE OF BIRTH
HEIGHT
WEIGHT
COLOR - HAIR
COLOR - EYES
U. S. CITIZEN ☐ YES ☐ NO

DDRESS: (NO. & STREET)
(CITY) (ZONE) (STATE)
PHONE NO. WHERE YOU CAN BE REACHED
☐ SINGLE ☐ SEPARATED
☐ MARRIED ☐ DIVORCED
☐ WIDOW (ER)
NO. OF DEP. CHILDREN
NO. OF OTHER DEPENDENTS
HAVE YOU HAD PREVIOUS EMPLOYMENT WITH THE CO. ☐ YES ☐ NO DATE:

OTIFY IN EMERGENCY: NAME - WIFE OR HUSBAND
ADDRESS

ONORABLE DISCHARGED ☐ YES ☐ NO
RANK WHEN DISCHARGED
SPECIALTY IF ANY IN THE SERVICE
WHAT TYPE OF WORK DO YOU WANT?

WORK EXPERIENCE (INCLUDE PERIODS OF SELF - EMPLOYMENT)

EMPLOYER OR COMPANY	ADDRESS	FROM		TO		JOB HELD	SUPERVISOR	REASON FOR LEAVING
		MO.	YR.	MO.	YR.			
RESENT OR LAST JOB								
ND LAST JOB								
RD LAST JOB								

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EDUCATION

HIGHEST GRADE COMPLETED	NAME OF LAST SCHOOL ATTENDED	LOCATION	COURSE OR MAJOR	DEGREE, IF ANY
SCHOOL 1 2 3 4 5 6 7 8				
IGH SCHOOL 1 2 3 4				
OLLEGE 1 2 3 4				

PECIAL TRAINING - TRADE SCHOOL, BUSINESS SCHOOL, CORRESPONDENCE

AME OF RELATIVE EMPLOYED BY CRUCIBLE
RELATIONSHIP
NAME OF RELATIVE EMPLOYED BY CRUCIBLE
RELATIONSHIP

AVE YOU EVER HAD A COMPENSABLE INJURY? WHAT WAS IT'S NATURE ☐ YES ☐ NO
WHAT PHYSICAL DEFECTS OR DISABILITIES DO YOU HAVE?

O YOU OBJECT TO AKING A PHYSICAL XAMINATION ☐ YES ☐ NO
DO YOU OBJECT TO TAKING TESTS THAT MAY HELP US TO BETTER PLACE YOU IN WORK THAT YOU LIKE ☐ YES ☐ NO
ARE YOU, OR HAVE YOU EVER BEEN A MEMBER OF THE COMMUNIST PARTY OR IT'S AFFILIATES? ☐ YES ☐ NO

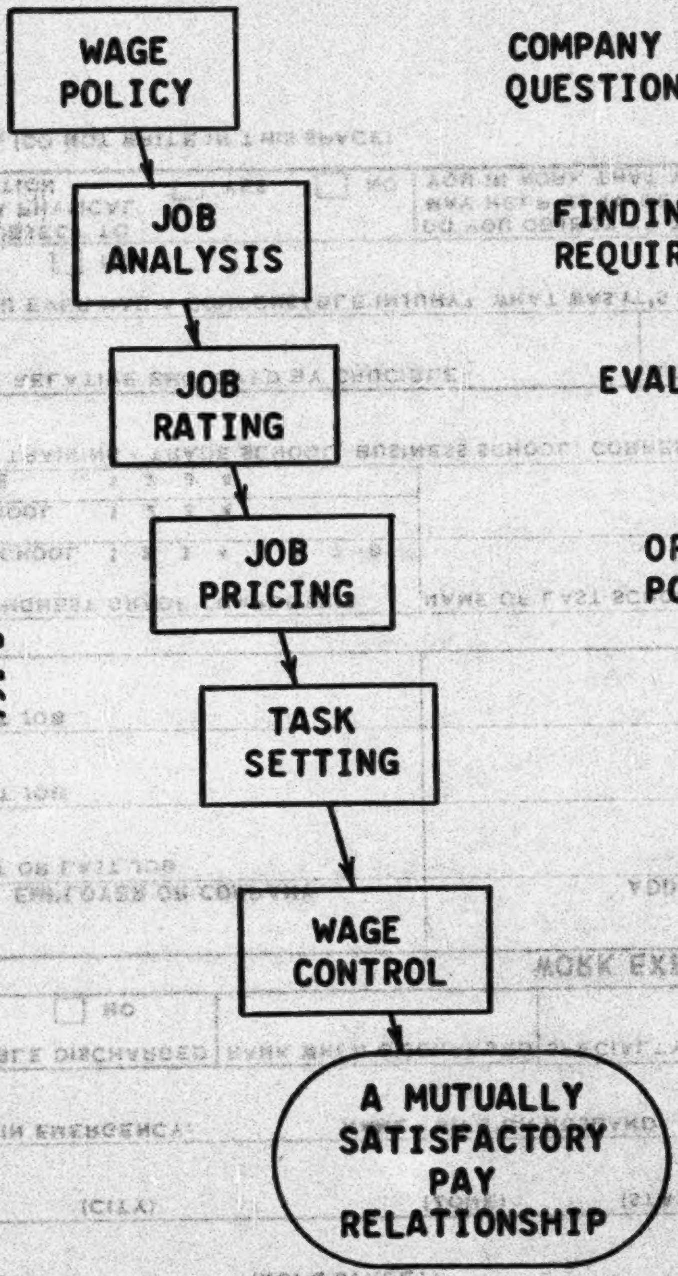
EMARKS: (DO NOT WRITE IN THIS SPACE)
WHERE YOU EVER ARRESTED OR CONVICTED OF ANY CRIME?
WHEN
WHERE

I HEREBY AGREE, AS A CONDITION OF EMPLOYMENT, TO WEAR PERSONAL SAFETY PROTECTION AND USE ANY SAFETY EQUIPMENT AS REQUIRED BY THE COMPANY IN THE PERFORMANCE OF MY JOB AND ABIDE BY ALL CRUCIBLE SAFETY RULES.

I CERTIFY, AS A CONDITION OF MY EMPLOYMENT, THAT ALL INFORMATION GIVEN ON THIS APPLICATION IS CORRECT. I UNDERSTAND THAT IF I HAVE FURNISHED FALSE INFC MAY BE DISCHARGED. I ALSO AUTHORIZE MY PREVIOUS EMPLOYERS TO GIVE YOU II ABOUT MY PAST RECORD.

D

MAJOR ACTIVITIES OF A WAGE AND SALARY ADMINISTRATOR


WAGE POLICY
JOB ANALYSIS
JOB RATING
JOB PRICING
TASK SETTING
WAGE CONTROL
A MUTUALLY SATISFACTORY PAY RELATIONSHIP

COMPANY INTENTIONS BASED ON SOCIAL AND ECONOMIC FACTORS, TRADE QUESTIONS, INDUSTRY AND COMPANY FINANCIAL CONDITIONS.

FINDING THE FACTS ABOUT JOBS, ACTUAL WORK PERFORMED, QUALIFICATIONS REQUIRED, RESPONSIBILITIES, AND JOB CONDITIONS.

EVALUATING THE HIERARCHY AND INTERRELATIONSHIP AMONG JOBS.

ORIGINATING PAY SCHEDULES BASED ON RATINGS, WAGE SURVEYS, POLICY AND COLLECTIVE BARGAINING.

STANDARDS FOR PERFORMANCE FOR INCENTIVE PAYMENT, QUANTITY, QUALITY, TIME REQUIREMENTS, MERIT RATING OF WORKER PERFORMANCE, AND CHARACTERISTICS FOR TIME PAID WORKERS.

SYSTEM OF WAGE RECORDS, TIME KEEPING, AND THE WORK OF THE PAYMASTER.

SOURCE: BETHEL, AND OTHERS. INDUSTRIAL ORGANIZATION AND MANAGEMENT. FIG. 23-1, P. 479.

Carrier

JOB CODE NO. F-231

DEPT. UEO AS

F

DIRECT SU

SUPT. OR DEPT. HEAD

JOB DESCRIPTION

JOB TITLE ASSEMBLER - GENERAL (LINE #4)

PRINCIPLE DUTIES CONSIST OF:

Perform various operations at all points on assembly line such as brazing, wiring, testing, charging, assembly and crating as required to keep work moving and to prevent production delays.

Relieve workers at assembly stations as required.

Check that stations are properly supplied with materials, fixtures, tools, etc. for model change-overs.

Instruct workers (new or otherwise) in proper assembly methods and in use of equipment.

Remove, replace, rewire components, rebraze joints, make minor repairs as required.

MATERIAL OR PRODUCTS WORKED ON:

Various model air conditioning, air-handling, and refrigeration units, sub-assemblies and components.

TYPICAL MEASURING INSTRUMENTS AND TOOLS:

Scale
Steel Tape
Fixed gauges
Wrenches
Pliers
Screwdrivers
Rubber Mallet

TYPICAL EQUIPMENT USED:

Spray Gun
Electric Hoist
Pneumatic Impact Wrench
Assembly Fixtures
Pneumatic Nut Runner
Brazing Equipment
Oil Pump
Vacuum Pump
Hose lines and connections
Leak Detection Equipment

POINTS 249 GRADE 7

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JOB TITLE: ASSEMBLER - GENERAL (LINE #4)

CODE: F-231 ABBREVIATED TITLE: GEN ASSM LINE 4

G

FACTORS	DEG.	BASIS OF RATING
EDUCATION	2 (28)	Use shop arithmetic. Work from fairly complicated drawings sketches, etc. Use various measuring, testing instruments. Equivalent to 2 years high school.
EXPERIENCE	2 (44)	6 to 12 months to become familiar with products and procedures.
INITIATIVE AND INGENUITY	3 (42)	Perform various operations at all points on assembly line such as brazing, wiring, testing, assembly of sub-assemblies. Relieve people on assembly operations as required. Judgment to assist in keeping work moving, prevent production delays and, as model changes are made, check stations for proper supplies, fixtures, tools. Train people on assembly line, new or otherwise.
PHYSICAL DEMAND	3 (30)	Most of the time sustained physical effort assembling, brazing, wiring. Some light physical effort training assemblers, testing, checking work, securing materials.
MENTAL OR VISUAL DEMAND	3 (15)	Continuous mental or visual attention positioning, assembling units, training assemblers, maintaining production schedules, repairing units.
RESPONSIBILITY FOR EQUIPMENT OR PROCESS	2 (10)	Careless use, handling may damage testing instruments, power tools. Damage seldom over $25.00.
RESPONSIBILITY FOR MATERIAL OR PRODUCT	3 (15)	Careless assembly, brazing, testing, improper instruction, failure to see that proper materials are supplies, may result in rework or scrap, cause production delays. Losses seldom over $150.00.
RESPONSIBILITY FOR SAFETY OF OTHERS	3 (15)	Careless handling of units, parts, materials, tools may result in injury to others. Possible burns from brazing torch.
RESPONSIBILITY FOR WORK OF OTHERS	3 (15)	Most of the time assist in the training of several inexperienced people. Occasionally responsible for checking or training a larger group of workers.
WORKING CONDITIONS	2 (20)	Good working conditions. May be dirty or oily at times.
UNAVOIDABLE HAZARDS	3 (15)	Falling material may crush hands or feet. Possible burns from torch. Possible cuts or bruises from sharp edges, corners.
		This description on the new job description form replaces F-231 dated 1/7/60. In accordance with Article XIII, Section 2 of the Labor Agreement, this [illegible]g done for all jobs where there has been no change in job

C-166

1 2 3 4 5

H

Foreman's and Superintendent's Copy

FRASER & JONES CO.
1290-S

GRIEVANCE FORM

Classification ☐

Number ☐

Department ______________________ **Date of Request** ______________________

Nature of Grievance:

Occupation ______________________

Payroll No. ______________________

Signed ______________________

FOREMAN'S DISPOSITION: **Granted** ________ **Rejected** ________ **Compromised** ________ **Referred to Superior** ________

Date ______________ **19** ____ **Signed** ______________________ **Foreman**

PLANT SUPERINTENDENT'S DISPOSITION: (2nd Step)

Granted ________ **Withdrawn** ________

Rejected ________ **Compromised** ________

Remarks:

Date of Disposition ______________________ ______________________
Plant Superintendent

MANAGER'S DISPOSITION (3rd Step)

Granted ________ **Rejected** ________ **Withdrawn** ________ **Compromised** ________ **Pending** ________

Remarks:

Date of Disposition ______________________ ______________________
Manager or Asst. Manager

For more space use other side

ENGINEERING

(Seminar Unit - 13)

I. Introduction

The organization and function of the engineering phase of an industry will depend to some degree upon the size of the industry and upon the type of product or service being produced. Some companies may have a separate division for research and development while other companies may incorporate this function as a part of the overall product and plant engineering responsibility.

II. Research and Development Function in Engineering

A. Importance of Research and Development (Quote #1) (1:1)
  1. Reason for research (2:102) (14:9-17)
    a. National security
    b. Technological competition
    c. Prestige
    d. Tax write off as current expense
    e. To improve profits
    f. New products and/or processes

B. Growth of Research and Development (A) (9:3) (15)
  1. Numbers employed (Quote #2)

1957 - 224,000
1958 - 238,000
1959 - 262,000
1960 - 286,300
1961 - 306,100
1962 - 319,800
1963 - 339,400

  2. Money spent for industrial research and development (B)
    a. Growth from $6.6 billion to $11.6 billion
    (thousands of dollars)

1956 - 6,598
1957 - 7,725
1958 - 8,363
1959 - 9,609
1960 - 10,507
1961 - 10,872
1962 - 11,560

    b. Government support of Research and Development
      (1) 58% of total in 1962
      39% of total in 1953

      (2) (thousands of dollars)

1956 - 3,325
1957 - 4,336
1958 - 4,759
1959 - 5,638
1960 - 6,082
1961 - 6,313
1962 - 6,729

    c. Industry support of Research and Development
    (thousands of dollars)

1956 - 3,270
1957 - 3,389
1958 - 3,604
1959 - 3,971
1960 - 4,425
1961 - 4,559
1962 - 4,831

3. **Funds spent for pure research (C)**
    a. **(millions of dollars)**
        1956 - 253   1960 - 388
        1957 - 271   1961 - 403
        1958 - 305   1962 - 461
        1959 - 332

III. Organization of Functions (Quote #3) (11:67)

A. Research and Development Functions (D) (6:Chart III)

1. Research
2. Development
3. Product engineering

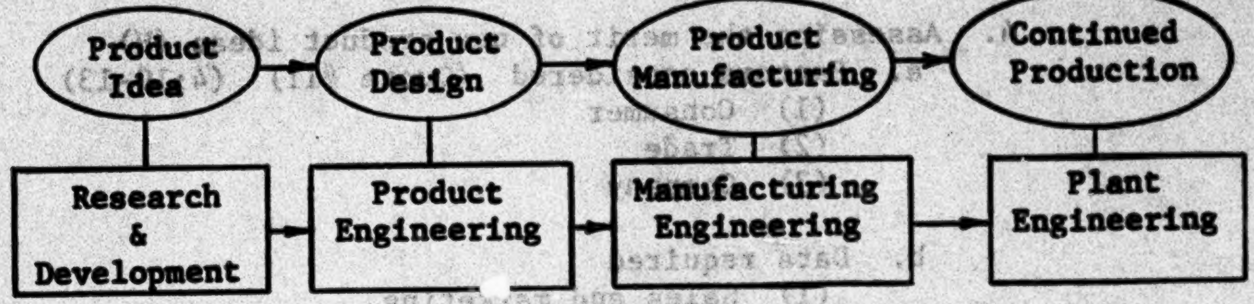
B. Sub-functions (E) (6:Chart III)

1. Research (Quote #4)
    a. Basic
    b. Applied

2. Development (Quote #5)
    a. Advanced development
    b. New product development and product improvement
    c. New process development and process improvement
    d. Product redevelopment

3. Product engineering (Quote #6)
    a. Product design
    b. Engineering testing
    c. Factory follow-up
    d. Sales assistance

C. Inter-relationship among Research, Development and Engineering (F) (5:88-99)


Product Idea
Product Design
Product Manufacturing
Continued Production
Research & Development
Product Engineering
Manufacturing Engineering
Plant Engineering

IV. Purposes and functions of Research and Development

A. Functions of Research Department (Quote #7) (2:105)

1. Improve current products
2. Develop new products
3. Protect company's patent position
4. Plan for the future
5. Test products

OR (Quote #8) (7:271)

1. Search for chemical or physical relationships

2. Improve products
3. Find new uses for products
4. Develop new products
5. Reduce costs of present products
6. Develop tests and specifications for operations and materials
7. Analyze competitors products
8. Find profitable uses for by-products

B. Purposes for Research money (Quote #9) (5:89)
  1. To improve the competitive position of the business
  2. Product improvement
  3. Round out product line
  4. Diversity with continuity
  5. Exploratory research
  6. Diversify into new fields

C. New Product Development and Product Re-development (11:71)
  1. Goals of product development
    a. Consumer acceptance
    b. Maintenance of balanced line of products
    c. Anticipated output and market protection
    d. Economical manufacture

  2. Frequency of new product introduction (G)
    a. 7.4% at least every year
    b. 14.2% every 1-3 years
    c. 36.1% every 3-5 years
    d. 23.9% every 5-10 years
    e. 18.4% every 10 years

  3. Identification of new product ideas (Quote #10) (5:22)
    a. Unrecorded resources
    b. Recorded resources
    c. Miscellaneous resources

  4. Assessing the merit of new product ideas (H)
    a. Factors considered (Quote #11) (4:10-13)
      (1) Consumer
      (2) Trade
      (3) Company
    b. Data required
      (1) Sales and marketing
      (2) Engineering
      (3) Financial

  5. Developing from idea to production (I) (Quote #12) (Example #1) (2:111)
    a. Idea (1. exploration)
    b. Preliminary approval (2. screening)
    c. Project approval
    d. Research specifications (3. specifications)
    e. Experimental investigations (4. development)
    f. Test runs and samples (5. testing)
    g. Final report

h. Approval for production
i. Release for production
j. Product and manufacturing engineering
k. Production (6. commercialization)

V. Product Engineering

A. Design engineering (11:74) (10:33)
1. Function
a. Design new products
b. Re-design existing products
c. Improvement in packaging

B. Product Design (3:41)
1. Function
a. Develop and adapt research findings for factory use
b. Provide efficient design

2. Criteria for a well designed product (7:346-364)
a. Costs
(1) Development
(2) Manufacturing

b. Manufacturing
(1) Feasibility
(2) Simplicity
(3) Materials

c. Marketing
(1) Appearance
(2) Functional
(3) Easily maintained

VI. Plant Engineering (7:282)

A. Need for maintenance
1. Efficiency
2. Preventative

B. Functions and responsibilities
1. Plant
2. Machines and equipment
3. Housekeeping
4. Safety

C. Budgetary provisions (11:118)
1. A part of production costs

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ENGINEERING

EXAMPLES

1. **New Product Check List Form.**

To include the following data:

- a. name of product
- b. description of product
- c. sales and marketing data
  - (1) history
  - (2) competitive data
  - (3) marketing determination
  - (4) sales forecast
  - (5) field service and/or parts required
  - (6) advertising and/or sales promotion plan
  - (7) distribution plan
  - (8) styling data

- d. engineering data
  - (1) technical features
  - (2) patent status
  - (3) nature of testing program

- e. financial data
  - (1) engineering costs to date
  - (2) estimate of additional engineering costs before production
  - (3) advertising and promotional costs
  - (4) total value of added equipment
  - (5) extent and life of amortization
  - (6) pricing (list price - discounts - average net billing costs)
  - (7) unit manufacturing costs
  - (8) profit

- f. estimate of production and availability dates

ENGINEERING

QUOTATIONS

Quote #1

The increasing resources devoted to research and development in the industrial sector underscore the expanding role of science and technology in the economy. This expansion reflects a national policy that emphasizes programs related to defense and to space research and development and is indicative of the growing awareness by companies of the importance of utilizing R. & D. activities to develop new products and processes for highly competitive market demands.

Quote #2

The full-time-equivalent number of R. & D. scientists and engineers in industry increased 52%, from 224,000 in January 1957 to 339,400 in January 1963. Year-to-year rates of increases have fluctuated between 5 and 10 percent, with an annual average rate of growth of 7 percent for the entire period. The annual rates of increases have been declining since 1959.

National Science Foundation, Research and Development in American Industry 1962, p. 3.

Quote #3

Whereas pure research deals with the basic sciences (mathematics, physics, etc.) and is engaged in principally for the sake of knowledge itself, applied industrial research has as its purpose the translation of the findings of pure research into new or improved processes, materials, and products. In recent decades applied research has become a necessary part of progressive management.

Shubin, J. A., Business Management, p. 67.

Quote #4

RESEARCH

Applied Research - Utilizing the results of basic research to achieve specified commercial goals.

Basic Research - Exploring nature scientifically and without specific commercial goals.

Maynard, Common Body of Knowledge Required by Professional Management Consultants, p. 41.

Quote #5

DEVELOPMENT

Advanced Development - Demonstrating working principles or systems of principles of prospective products or processes by means of theoretical or tangible operating models.

New Process Development and Process Improvement - Designing new and improved manufacturing systems, operations, and facilities so they best achieve stated technical performance requirements.

New Product Development and Product Improvement - Designing new and improved products so they best achieve stated performance requirements.

Product Redevelopment for Cost Reduction - Reappraising and redesigning products with respect to materials, appearance, performance, and manufacturing requirements to reduce costs and improve quality.

Maynard. p. 41.

Quote #6

PRODUCT ENGINEERING

Engineering Test	Verifying intended product compliance with established standards for quality, performance, reliability, manufacturability, and serviceability.
Factory Follow-up	Providing engineering assistance to eliminate manufacturing difficulties.
Product Design	Specifying by means of drawings, instructions, standard practices, and otherwise, the shape, composition, performance, and quality characteristics required of products.
Sales Assistance	Providing engineering aid in adapting products to customers' use requirements.

Maynard, Common Body of Knowledge, p. 41.

Research departments are usually expected to perform the following important functions:

1. Improve Current Products. A product never is completely perfected nor perfect, and continuing research for product improvements is imperative if a firm does not want to be stranded in a pool of technologically stagnant merchandise.

2. Develop New Products. This function is particularly important to those companies where technology moves at a fast pace. It includes not only internal research, but also keeping up with other companies' new products and evaluating them with respect to competitiveness and possible adaption and use by their own company.

3. Protect the Company's Patent Position. Where full-time patent attorneys are not retained by a company, the research department has the responsibility of liaison work with outside patent attorneys to evaluate newly issued patents to make sure competitors are not infringing on the company's patent position.

4. Plan for the Future. Research essentially deals with the future, and research personnel are in a strong position to aid management in planning for tomorrow's product and tomorrow's work.

5. Test Products. Experimenting and testing deal with analyzing and evaluating a competitor's product as well as our own. The objective is to indicate its attributes, weaknesses, and possibilities of substituting for other products currently on the market.

6. Give Scientific Advice. Frequently the best scientific personnel in a firm work in the research department. It is not uncommon, therefore, for management to look to the research departments for scientific advice and explanations about products, processes, and phenomena.

7. Evaluate Diversification Possibilities. The research department is in a unique position to advise management on the technical and scientific aspects of possible acquisitions and how they would relate to the company and its capacities.

8. Help Evaluate Scientific Markets. Although the sales organization has the responsibility for market evaluation, the research department often can be of real aid to the sales department in evaluating a particular technical or scientific market. This is especially true where the company is considering developing a new product for a scientific market.

George, Management in Industry, p. 105-106.

Quote #8

Usually industrial companies carry on research to try to:

1. Search for basic chemical or physical relationships, particularly those having to do with their own products or processes.
2. Improve their products.
3. Find new uses for their present products.
4. Develop new products.
5. Reduce the cost of present products by improving operations and processes.
6. Develop tests and specifications for operations and purchased materials.
7. Analyze competitors' products.
8. Find profitable uses for by-products.

Moore, Manufacturing Management, p. 271

Quote #9

It has been proposed by Mr. R. C. Dale, an executive of the successful Nashua Corporation, that:

1. the first research dollar increment be spent because you are in business.
2. spend the second dollar to improve the existing product.
3. spend the third dollar to round out the product line.
4. spend the fourth dollar to diversify while still maintaining a thread of continuity.
5. spend the fifth dollar in pure exploratory research.
6. spend the sixth dollar to diversify into new fields -- fields having no thread of continuity with present products.

Karger, The New Product. The Industrial Press, p. 89.

Quote #10

Sources of New Product Ideas

Unrecorded sources:

1. plant personnel
2. professional associates
3. friends
4. company salesmen
5. manufacturing engineering sales representatives
6. advertising agency personnel
7. vendors
8. government personnel
9. equipment
10. customers

Recorded sources: (at least partially)

1. published lists of available new products
2. licenses available from the government
3. licenses available from industry
4. professional marketing firms offering new inventions
5. articles in professional and trade journals
6. New Product announcement
7. "I wish I could buy....." columns

Miscellaneous sources:

1. professional research and development companies
2. public utility companies interests in area commercial development
3. city, county, and state industrial development commissions
4. trade associations interests in specific areas of industrial activities
5. commercial bankers directing new product financing activities
6. organizations and individuals available to search patent records for development ideas
7. company acquisition (product line expansion--not new product development)
8. internal make-buy decisions

Karger, The New Product, The Industrial Press, p. 22-23.

HOW TO RECOGNIZE IN ADVANCE A NEW PRODUCT YOUR COMPANY CAN INTRODUCE.

FACTORS:

From the user's standpoint:

1. Is it going to be less expensive than presently used, similar products?
2. Is it going to be easier to use; will it save time and effort?
3. Is it going to be better designed or packaged?
4. Is the new product going to permit the user to do something desirable which would be more difficult or even impossible to do without it?
5. Is it going to be demonstrably better in quality?

From the trade's standpoint:

6. Is the new product going to produce additional business for the trade without effecting present business?
7. Will the new product result in the sale or merchandising of related products?
8. Is the new product going to be more profitable to the trade than existing products?
9. Is it going to invite new customers for the trade?

From the standpoint of company management:

10. Is it going to have satisfactory gross profit?
11. Is its potential sales volume adequate?
12. Is it going to require a capital investment you can afford?
13. Is it going to employ your present manufacturing facilities or special facilities?
14. Is it going to be sold through your presently established distributive channels -- or lead you into completely new fields?
15. Can the new product get a "free-ride" on the advertising, merchandising, and sales programs of your presently established items, or will it require special effort?
16. Will it require the addition of extra executive and administrative personnel?
17. Is it a "compatible" product -- logical for your kind of company and your industry?

Hilton, Peter, New Product Introduction for Small Business Owners, p. 10-13.

Quote #12

The process of developing new products contains six steps that can be fairly well defined:

1. Exploration. This is the search stage in which ideas for new products are sought.

2. Screening. Screening consists of a preliminary evaluation to determine whether the idea has possibilities and should be further pursued, or whether it should be dropped.

3. Specifications. If the proposed product passes the screening test, it is then expanded into a realistic business recommendation. In this step, a more thorough analysis is made of the marketability of the product, the features that consumers may desire, and competitors' probable actions. Finally a schedule and budget are established for prototypes or models.

4. Development. This step consists of transforming an idea for a product into an actuality. Prototypes of the new product are built so they can be shown and demonstrated.

5. Testing. This is a critical stage where the worth of the original product idea and the judgment about its feasibility are proved or disproved. When a final agreement is reached on the exact specifications for the product, the design is "frozen", that is, no additional design changes are made.

6. Commercialization. Commercialization consists of all the actions involved in full scale production of the product, advertising and selling the product, and pledging that the company, with its resources, will stand behind and guarantee the new product.

George, Management in Industry, p. 111-112.

ENGINEERING

INDEX TO TRANSPARENCIES

A. Growth of Research and Development (Numbers Employed)

B. Growth of Research and Development (Dollars Spent)

C. Growth of Research and Development (Dollars Spent for Pure Research)

D. Research and Development Functions

E. Sub-Functions of Research and Development

F. Interrelationship of Research - Engineering and Production

G. Frequency of New Product Introductions

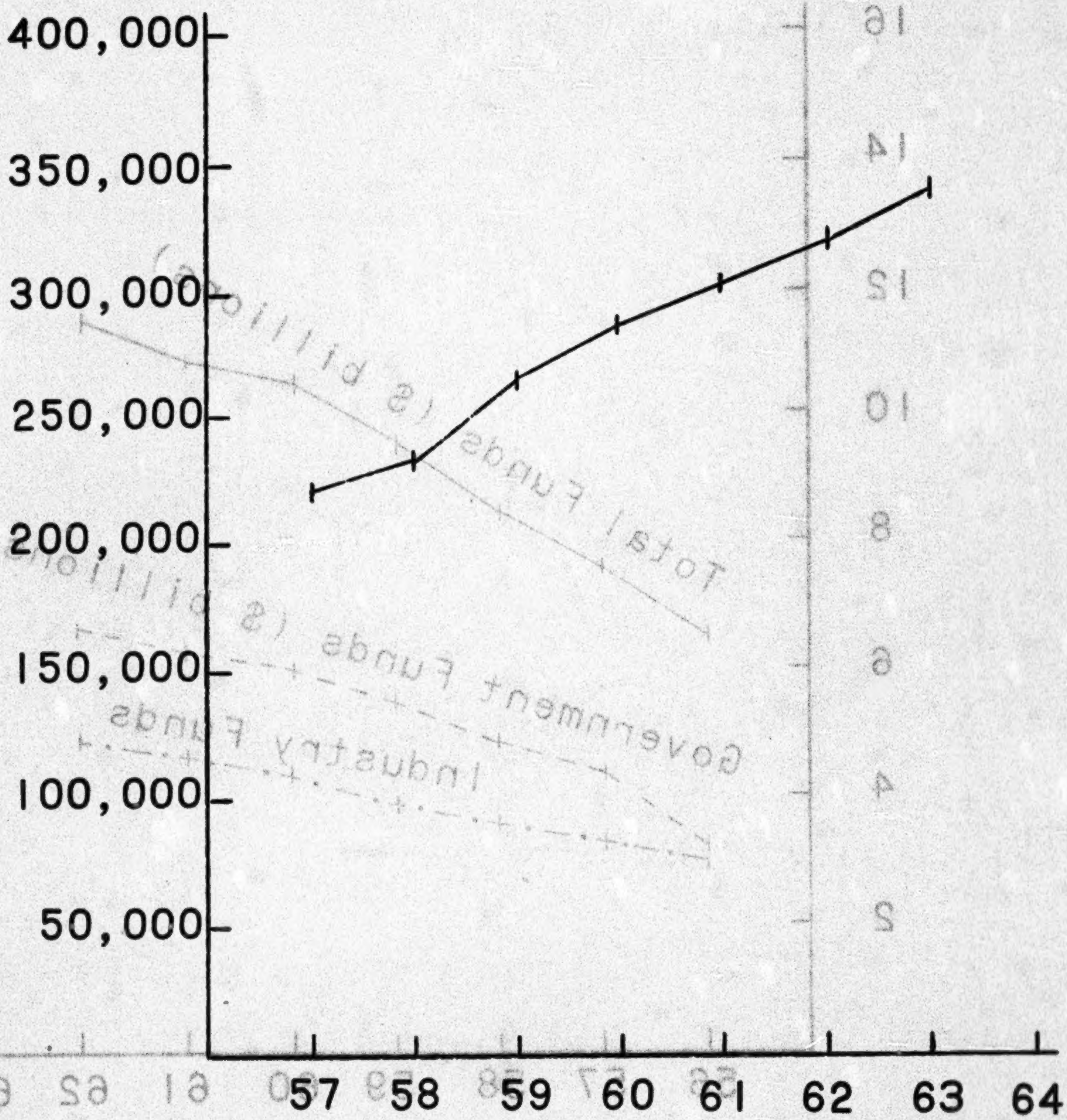
H. Assessing the Merit of New Product Ideas

I. Typical Path of a Research Project - Idea to Production

A

GROWTH OF RESEARCH AND DEVELOPMENT

(NUMBERS EMPLOYED)

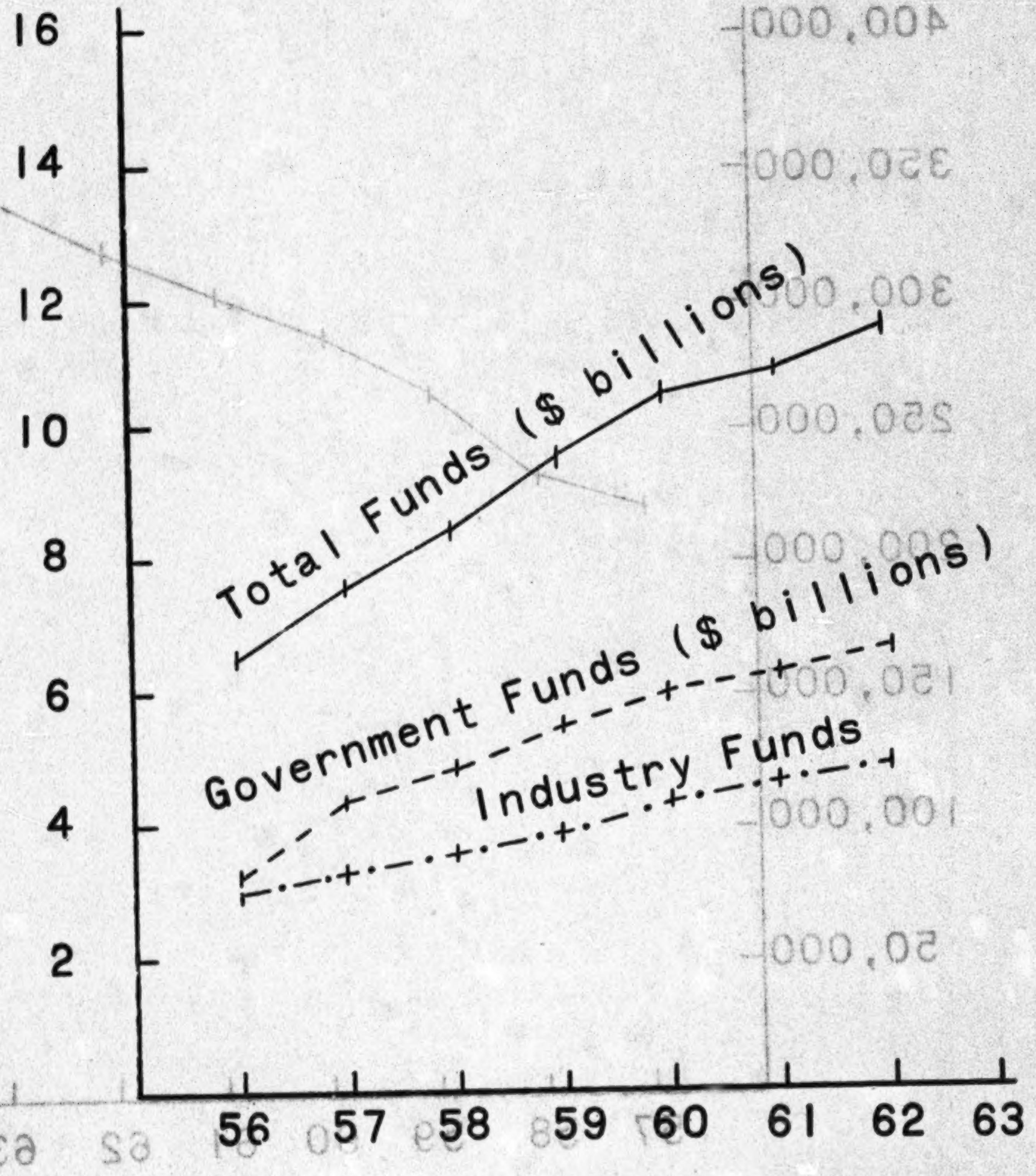


NATIONAL SCIENCE FOUNDATION, RESEARCH & DEVELOPMENT IN AMERICAN INDUSTRY

B

GROWTH OF RESEARCH AND DEVELOPMENT

(INDUSTRIAL, GOVERNMENT, AND TOTAL FUNDS SPENT IN BILLIONS OF DOLLARS)



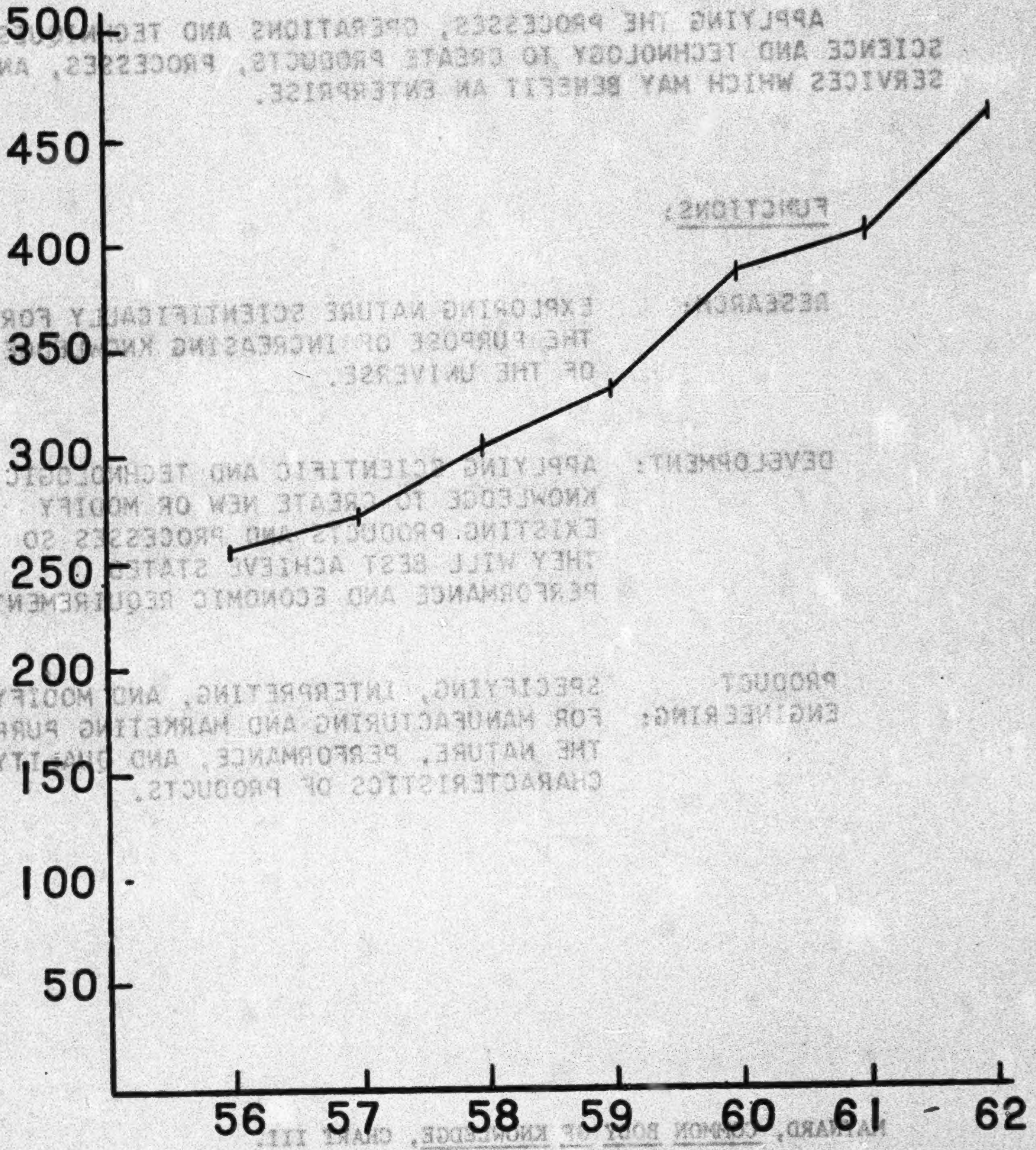
NATIONAL SCIENCE FOUNDATION, RESEARCH & DEVELOPMENT IN AMERICAN INDUSTRY

C-184

C

GROWTH OF RESEARCH AND DEVELOPMENT

(FUNDS EXPENDED FOR PURE RESEARCH IN MILLIONS)



NATIONAL SCIENCE FOUNDATION, RESEARCH & DEVELOPMENT IN AMERICAN INDUSTRY

D

RESEARCH AND DEVELOPMENT

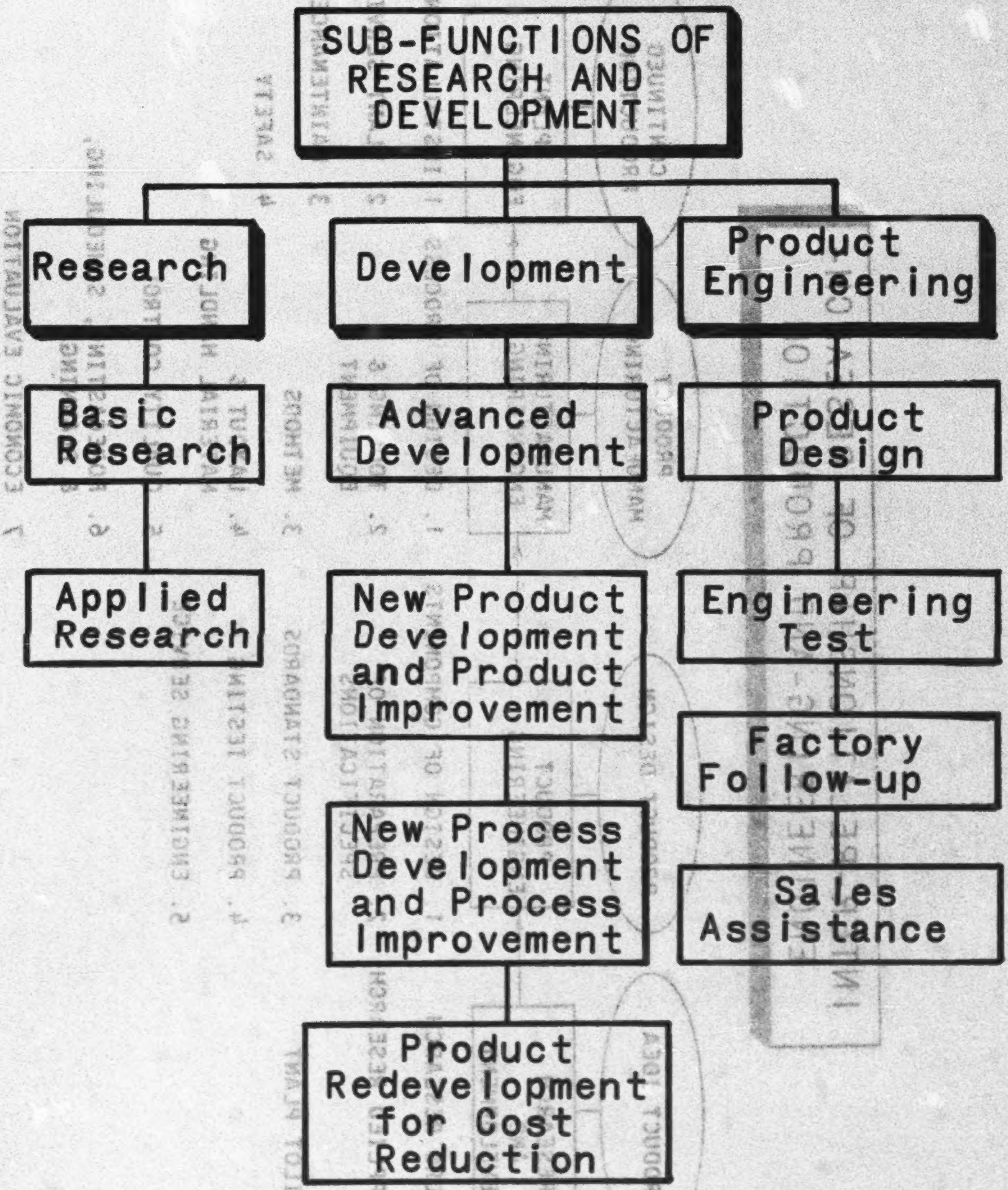
APPLYING THE PROCESSES, OPERATIONS AND TECHNIQUES OF SCIENCE AND TECHNOLOGY TO CREATE PRODUCTS, PROCESSES, AND SERVICES WHICH MAY BENEFIT AN ENTERPRISE.

FUNCTIONS:

RESEARCH:	EXPLORING NATURE SCIENTIFICALLY FOR THE PURPOSE OF INCREASING KNOWLEDGE OF THE UNIVERSE.
DEVELOPMENT:	APPLYING SCIENTIFIC AND TECHNOLOGIC KNOWLEDGE TO CREATE NEW OR MODIFY EXISTING PRODUCTS AND PROCESSES SO THEY WILL BEST ACHIEVE STATED PERFORMANCE AND ECONOMIC REQUIREMENTS.
PRODUCT ENGINEERING:	SPECIFYING, INTERPRETING, AND MODIFYING FOR MANUFACTURING AND MARKETING PURPOSES THE NATURE, PERFORMANCE, AND QUALITY CHARACTERISTICS OF PRODUCTS.

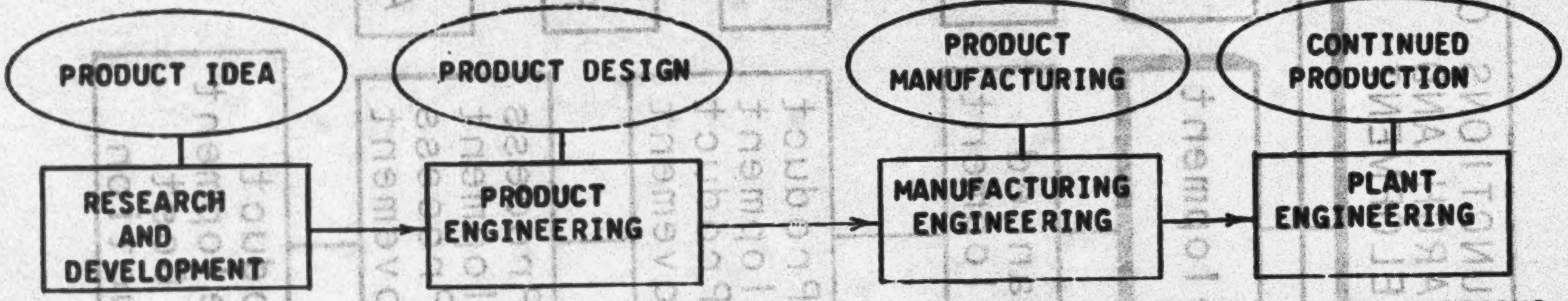
MAYNARD, COMMON BODY OF KNOWLEDGE, CHART III.

E


SUB-FUNCTIONS OF RESEARCH AND DEVELOPMENT
Research
Development
Product Engineering
Basic Research
Applied Research
Advanced Development
New Product Development and Product Improvement
New Process Development and Process Improvement
Product Redevelopment for Cost Reduction
Product Design
Engineering Test
Factory Follow-up
Sales Assistance

MAYNARD, COMMON BODY OF KNOWLEDGE, CHART III.

INTER-RELATIONSHIP OF RESEARCH-ENGINEERING-AND PRODUCTION


PRODUCT IDEA
RESEARCH AND DEVELOPMENT
PRODUCT DESIGN
PRODUCT ENGINEERING
PRODUCT MANUFACTURING
MANUFACTURING ENGINEERING
CONTINUED PRODUCTION
PLANT ENGINEERING

RESEARCH AND DEVELOPMENT

1. PURE RESEARCH
2. APPLIED RESEARCH
3. PILOT PLANT

PRODUCT ENGINEERING

1. DESIGN OF COMPONENTS
2. PREPARATION OF SPECIFICATIONS
3. PRODUCT STANDARDS
4. PRODUCT TESTING
5. ENGINEERING SERVICE

MANUFACTURING ENGINEERING

1. DESIGN OF PROCESS
2. TOOLING & EQUIPMENT
3. METHODS
4. LAYOUT & MATERIAL HANDLING
5. QUALITY CONTROL
6. FORECASTING, SCHEDULING, & PLANNING
7 ECONOMIC EVALUATION

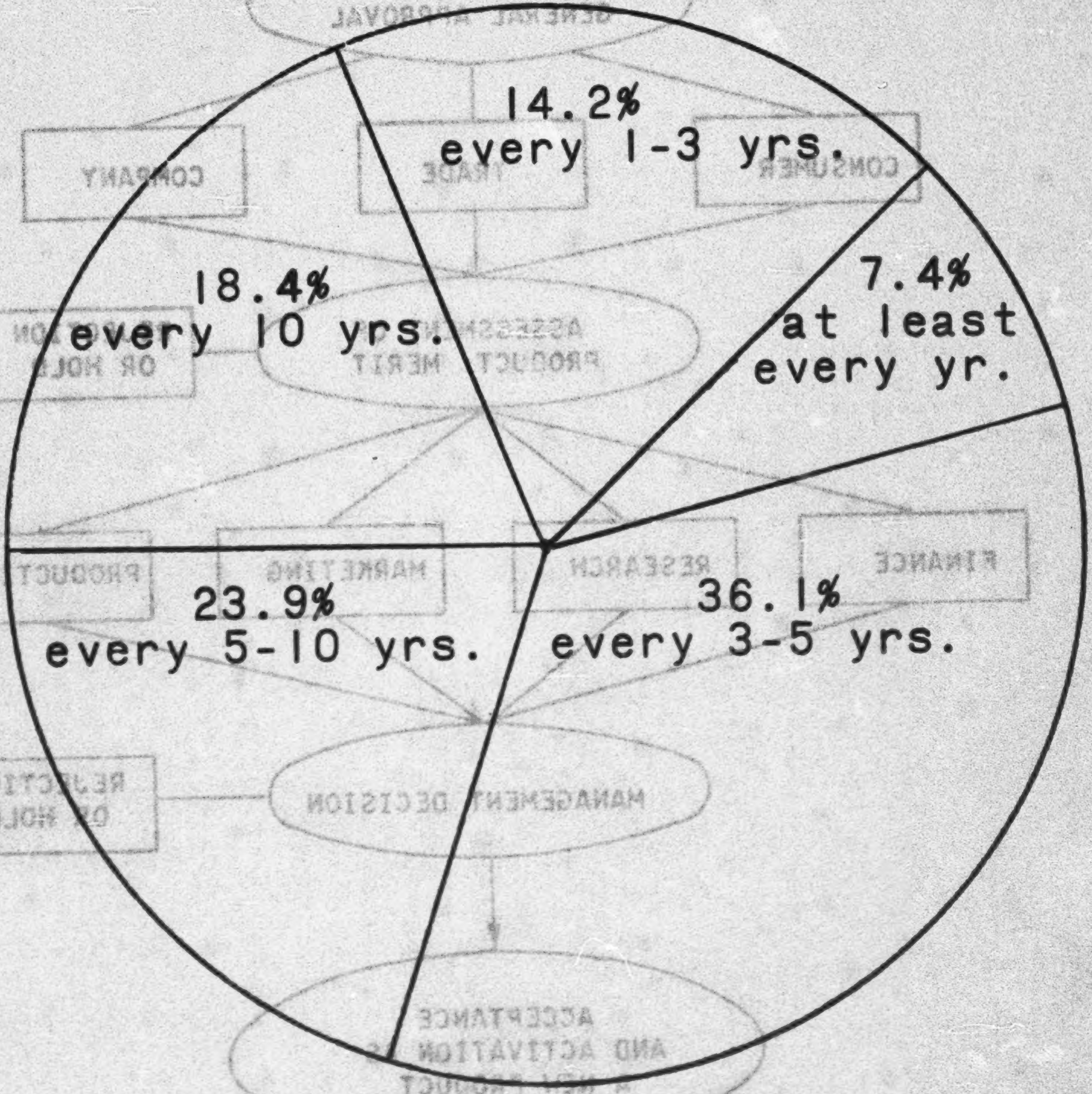
PLANT ENGINEERING

1. INSTALLATIONS
2. PLANT SERVICES
3. MAINTENANCE
4. SAFETY

F

KARGER, THE NEW PRODUCT, P. 88.

FREQUENCY WITH WHICH MANUFACTURING BUSINESSES INTRODUCE NEW PRODUCTS

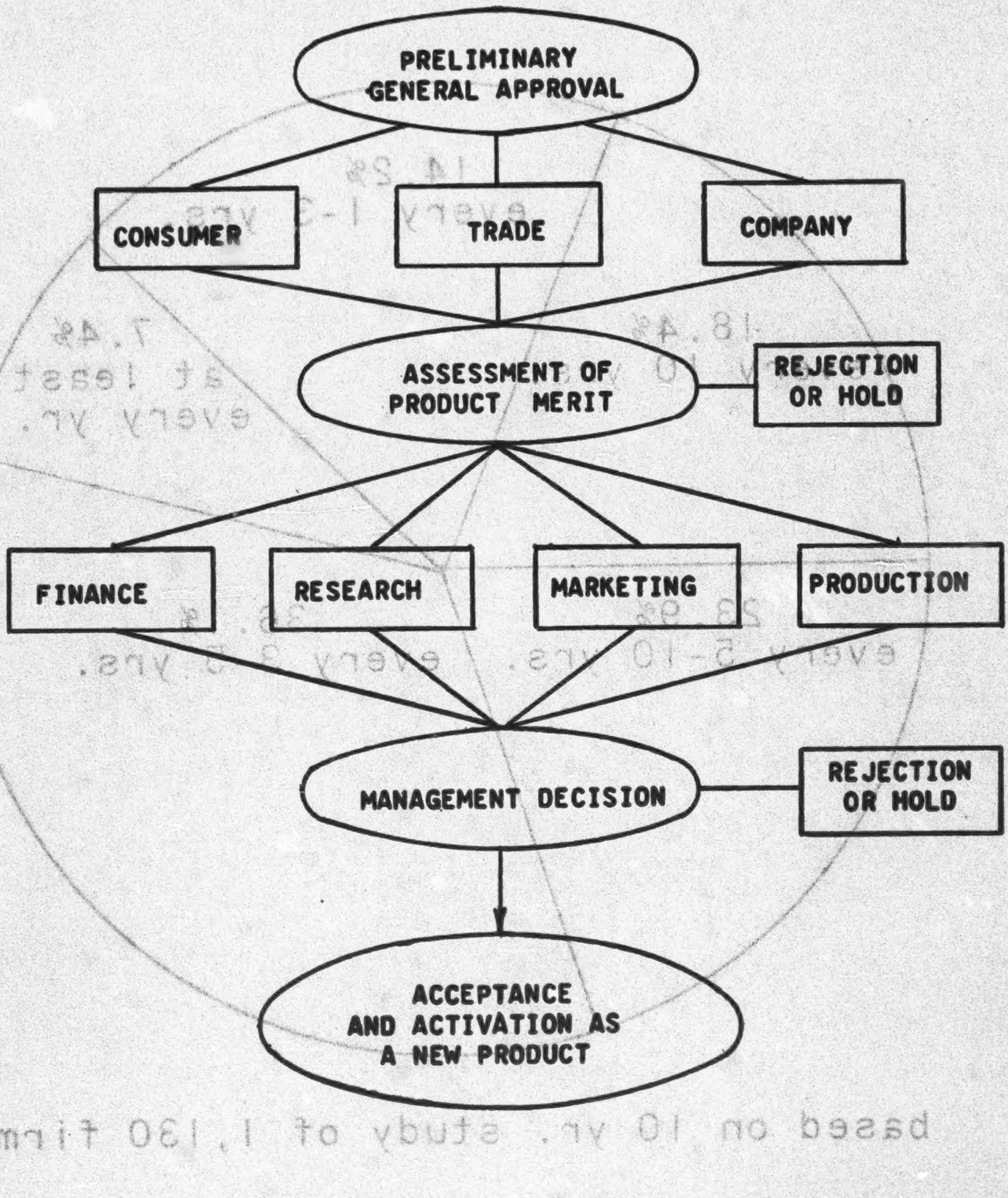


based on 10 yr. study of 1,130 firms

SHUBIN, BUSINESS MANAGEMENT, P. 71.

H

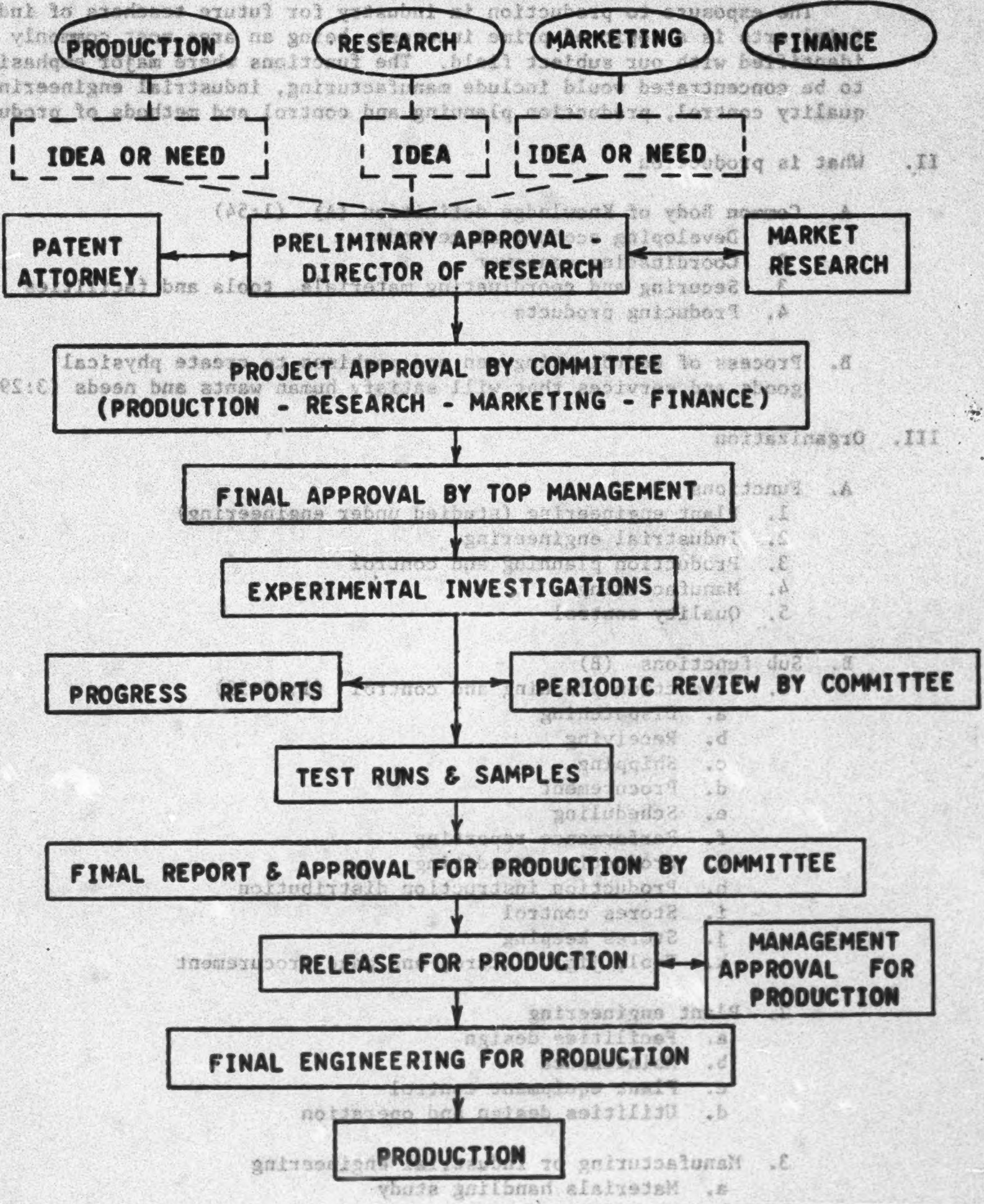
ASSESSING THE MERIT OF NEW PRODUCT IDEAS


PRELIMINARY GENERAL APPROVAL
CONSUMER
TRADE
COMPANY
ASSESSMENT OF PRODUCT MERIT
REJECTION OR HOLD
FINANCE
RESEARCH
MARKETING
PRODUCTION
MANAGEMENT DECISION
REJECTION OR HOLD
ACCEPTANCE AND ACTIVATION AS A NEW PRODUCT

HILTON, NEW PRODUCT INTRODUCTION FOR SMALL BUSINESS OWNERS, P. 10.

1

TYPICAL PATH OF A RESEARCH PROJECT - IDEA TO PRODUCTION


PRODUCTION
RESEARCH
MARKETING
FINANCE
IDEA OR NEED
IDEA
IDEA OR NEED
PATENT ATTORNEY
PRELIMINARY APPROVAL - DIRECTOR OF RESEARCH
MARKET RESEARCH
PROJECT APPROVAL BY COMMITTEE (PRODUCTION - RESEARCH - MARKETING - FINANCE)
FINAL APPROVAL BY TOP MANAGEMENT
EXPERIMENTAL INVESTIGATIONS
PROGRESS REPORTS
PERIODIC REVIEW BY COMMITTEE
TEST RUNS & SAMPLES
FINAL REPORT & APPROVAL FOR PRODUCTION BY COMMITTEE
RELEASE FOR PRODUCTION
MANAGEMENT APPROVAL FOR PRODUCTION
FINAL ENGINEERING FOR PRODUCTION
PRODUCTION

GEORGE, MANAGEMENT IN INDUSTRY, P. 111.

PRODUCTION
(Seminar Unit - 14)

I. Introduction

The exposure to production in industry for future teachers of industrial arts is a topic of prime interest, being an area most commonly identified with our subject field. The functions where major emphasis is to be concentrated would include manufacturing, industrial engineering, quality control, production planning and control and methods of production.

II. What is production

- A. Common Body of Knowledge definition (A) (1:54)
    1. Developing economical methods
    2. Coordinating manpower
    3. Securing and coordinating materials, tools and facilities
    4. Producing products
- B. Process of coordinating men and machines to create physical goods and services that will satisfy human wants and needs (3:299)

III. Organization

- A. Functions
    1. Plant engineering (studied under engineering)
    2. Industrial engineering
    3. Production planning and control
    4. Manufacturing
    5. Quality control
- B. Sub functions (B)
    1. Production planning and control (1:43-59)
        - a. Dispatching
        - b. Receiving
        - c. Shipping
        - d. Procurement
        - e. Scheduling
        - f. Performance reporting
        - g. Production expediting
        - h. Production instruction distribution
        - i. Stores control
        - j. Stores keeping
        - k. Tool, jig, fixture, and gage procurement
    2. Plant engineering
        - a. Facilities design
        - b. Maintenance
        - c. Plant equipment control
        - d. Utilities design and operation
    3. Manufacturing or Industrial engineering
        - a. Materials handling study
        - b. Methods study

    c. Plant layout
    d. Tool and jig manufacture and repair
    e. Work measurement

  4. Manufacturing
    a. Final assembly
    b. Part manufacture
    c. Service and repair
    d. Sub-assembly

  5. Quality control
    a. Control methods
    b. Customer complaints
    c. Gage control
    d. Inspection
    e. Salvage

IV. Description of sub functions

A. Production planning and control (4:9-15)
  1. Definition and description
    a. Preparing, issuing and encouraging compliance with schedules
    b. Integrate and coordinate manpower, machines and materials (6:195)

  2. Benefits of production (Quote #1)
    a. Consumer
    b. Producer
    c. Investors
    d. Suppliers
    e. Community
    f. Nation

  3. Place of production control (C) (2:156-165)
    a. Receives information from engineering and time study and issues paper work to manufacturing and accounting (D-1)
    b. Planning phase between sales department and purchasing personnel, and manufacturing departments in job order shop (D-2)

  4. Steps in production planning
    a. Revise product design and requirements
    b. Develop new process plans
    c. Determine manufacturing sequence
    d. Determine equipment and personnel needs
    e. Determine material requirements
    f. Estimate activity costs
    g. Finalize plan

    OR

    a. Planning (3:310-311)
    b. Routing

c. Scheduling
d. Dispatching

5. Operation of plan (D-3)
a. Cycle of events
(1) Action
(2) Feed back
(3) Evaluation
(4) Adjustment

b. Phasing production (E)
(1) Gap phasing
(2) Lap phasing

6. Scheduling (2:215-231)
a. Continuous production schedules
b. Job order schedule (F)
(1) Lead time

B. Manufacturing engineering
1. Plant layout (2:68) (5:136-155)
a. Sequence
(1) Determine factory size
(2) Geographical studies
(3) Equipment layout and arrangement
(4) Determine type of structure
(5) Determine service facilities
(6) Schedule construction
(7) Schedule equipment installation

b. Growth of plant
(1) Compared to production volume

c. Types of layouts (G) (H) (I)
(1) Line or product layout (Quotes #2 & #3)
(a) description
(b) advantages
(c) disadvantages

(2) Process layout (Quote #4)
(a) description
(b) advantages
(c) disadvantages

d. Devices used in layout
(1) Process flow chart or process chart
(a) description
(b) techniques
1. symbols
2. chart

(2) Process flow diagram or flow chart (J)
(a) description
(b) techniques

- (3) Visualization techniques
  - (a) templates
  - (b) models
  - (c) layout drawings
  - (d) plot plans

- 2. Work measurement (2:31-51)
  - a. Description
    - (1) Establishing time standards

  - b. Procedure for time study
    - (1) Preparation (Quote #5)
      - (a) operation analyzed
      - (b) worker chosen
      - (c) facilities checked

    - (2) Timing (K)
      - (a) operation (Quote #6)
      - (b) cycles times (Quote #7)

    - (3) Determining normal time
      - (a) description (Quote #8)

    - (4) Determining standard times
      - (a) description (Quote #9)

  - c. Other work measurement techniques (Quote #10) (L-1,L-2)
    - (1) Predetermined time systems
      - (a) explanation
      - (b) devices

    - (2) Experience data
    - (3) Work sampling
    - (4) Estimates

- C. Manufacturing
  - 1. Definitions
    - a. Making products for sale by changing the shape, composition or combination of materials, parts, or sub assemblies

  - 2. Classification of manufacturing enterprises (Quote #11)
    - a. Extractive
    - b. Analytical
    - c. Synthetic
    - d. Fabricating

    OR

    - a. Analytical (Quote #12)
    - b. Synthetical
    - c. Processing
    - d. Fabrication
    - e. Integrated
    - f. Construction

3. Types of production (Quote #13)
   a. Continuous
   b. Intermittent
      (1) Project
      (2) Job lot
      (3) Batch

4. Manufacturing processes
   a. Types of processes used in plants such as:
      (1) Casting
      (2) Cutting
      (3) Machining
      (4) Stamping
      (5) Etc.
   b. Sequence of processes

D. Quality control (5:247-267) (4:186-194)
   1. Definitions (Quote #14)
      a. Quality control
      b. Inspection
   2. Benefits of quality control (Quote #15)
      a. Maintenance of quality
      b. Uniform work
      c. Economical production
      d. Prevention of waste
      e. Checking work for piece rate
   3. Techniques

V. Review

A. Production planning and control
   1. Function
      a. Preparing, issuing and encouraging compliance with schedules (Example #1)
   2. Benefits of planning and control
   3. Steps in planning and control
      a. Planning
      b. Routing (Example #2)
      c. Scheduling
      d. Dispatching
   4. Operation
      a. Action
      b. Feed back
      c. Evaluation
      d. Adjustment
   5. Schedules

B. Manufacturing engineering
   1. Plant layout (Example #3)

- a. Types
    - (1) Line
    - (2) Process
- b. Devices
    - (1) Flow chart
    - (2) Process chart
    - (3) Visual techniques

2. Work measurement
    - a. Time study
    - b. Predetermined times
    - c. Experience data
    - d. Work sampling
    - e. Estimating

C. Manufacturing
  1. Classifications
      - a. Extractive
      - b. Analytical
      - c. Synthetic
      - d. Fabricating

  2. Types
      - a. Continuous
      - b. Intermittent

  3. Processes

D. Quality control
  1. Benefits
  2. Techniques

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6. Shubin, John A., *Business Management*. New York, New York, Barnes and Noble, 1965.

PRODUCTION

EXAMPLES

1. Sales Schedule.

To include the following data:
- a. name of product
- b. name of customer
- c. due date information
- d. back order information
- e. production information by date

2. Factory Order (Route Sheet).

To include the following data:
- a. part name
- b. order number
- c. material specifications
- d. description and sequence of operations to be performed
- e. inspection information

3. Plant Layout.

Drawing to illustrate the following:
- a. receiving of raw material
- b. storage of raw material
- c. pre-processing areas
- d. part manufacturing
- e. sub assembly area
- f. final assembly area
- g. inspection areas
- h. finishing and packaging
- i. finished product storage
- j. shipping
- k. office
- l. research and development
- m. engineering

PRODUCTION

QUOTATIONS

Quote #1

Present and potential benefits of production forecasting, planning and control:

A. Benefits to consumers:

1. Increased productivity
2. Better values
3. Deliveries at proper times

B. Benefits to producers: (people whose work contributes to the production)

1. Adequate wages
2. Uninterrupted employment
3. Job security
4. Improved working conditions
5. Increased satisfaction

C. Benefits to investors:

1. Security
2. Adequacy of return

D. Benefits to suppliers:

1. Cooperation

E. Benefits to community:

1. Stability

F. Benefits to nation:

1. Security
2. Prosperity

MacNiece, Production Forecasting, Planning and Control, pp. 6-11.

Quote #2

Product or Line Layout:

Under product groupings, all equipment and operations are arranged in a continuous line (though not necessarily a straight line) in the sequence required to manufacture the product. This arrangement is suitable for repetitive processes employed to manufacture a large volume of standard products.

Advantages:

1. Channelized flow of work permits low-cost mechanization of material handling.
2. Semi-skilled labor can be used to operate special-purpose equipment.
3. Inspection may be economical because, in an integrated line, defective work is often segregated.
4. There is a minimum of goods in process because of shorted processing time.
5. Relatively easy and simple production control is possible.

Disadvantages:

1. High initial investment is required for the specialized facilities.
2. The arrangement is comparatively inflexible.
3. Aggregate overhead costs are high, and idle capacity is expensive.
4. The production line is vulnerable to interruption and shutdowns.
5. Demands on the supervisors are sometimes heavy since they are responsible for diverse activities.

Shubin, Business Management, pp. 144-146.

Quote #3

Process Layout:

In process layout, similar machines or operations are grouped functionally and set up as shops or departments. This arrangement is suitable for non-repetitive processes employed in job-order plants.

Advantages:

1. The initial investment is rather low.
2. Production facilities are flexible because the groupings of general-purpose equipment provides access to any type of operation.
3. Machine failures and job difficulties do not seriously disrupt production schedules.
4. Effective foremanship may be readily achieved because the supervisor may become expert in the work in his shop.

Disadvantages:

1. Material handling is more expensive and costly than under product line layout.
2. Skilled labor is required to operate general purpose machinery.
3. Inspection is more frequent and costly because work usually must be checked after each operation or before it leaves the department.
4. Production time is longer, requiring more goods in process.
5. Production control is complex and costly.

Shubin, Business Management, pp. 146-147.

Quote #4

The Process Flow Chart is a graphical map that follows material through its manufacturing cycle and records the sequence of the elements of that cycle as they occur.

Bethel and others, Industrial Organization and Management, p. 199.

Quote #5

During the preparation phase it is necessary to determine the exact elements and subelements of the operation that is to be timed, the number of subdivisions being determined principally by the degree of accuracy desired.

During this phase it is also necessary to select the operator to be timed and determine the number of timings that should be made. Since standard time is normally based on what the "average" worker can do, the study should measure the performance of a worker who appears to have average skill and ambition.

Strong, The Management of Business, p. 169.

Quote #6

Timing the job:

Elements can be timed by the snap-back method or by the continuous method.

Snapback: the watch is read at the end of each element and the hands are snapped back to zero. The observer records the time value for each element.

Continuous: the watch is started at the beginning of the first element and is not stopped until the end of the study. The observer records the watch reading at the end of each element.

George, Management in Industry, p. 374.

Quote #7

Number of cycles to time:

An operator does not work continuously at the same identical pace. Therefore, it is necessary to time several cycles of the job to get a representative sample of the time required by him to perform the work. The number of cycles that should be timed depends upon the nature of the work, but should be large enough to give an adequate sample.

George, Management in Industry, pp. 374-375.

Quote #8

Normal time:

The repeated timings are reviewed in an attempt to establish a base time or a normal time for the operation. The base time is an average of the repeated timings after any unusually high or low times have been discarded.

Quote #9

Standard time:

When the base time has been established, corrections or allowances must be made for interruptions that occur during a "typical" workday. Such allowances include the time required to obtain tools and materials, rest periods, personal needs of the worker, etc.

Strong, The Management of Business, p. 170.

Quote #10

1. Predetermined time systems: When the production operation is divided into various elements and the elements further divided into basic movements, established data can be consulted in order to assign a time value to each movement. When the time values for each movement is totaled, a time value for the work element is determined.

2. Experience data: From records of the units produced and the man hours they require, a unit time figure may be calculated. If the same operation is performed at a later date, the unit time figure may be consulted.

3. Work sampling: This consists of sampling the production process to determine the amount of time required to produce various work units. The work unit may be an entire production operation or a small part of the operation.

4. Estimates: This method is of varying value depending on the degree of accuracy required and the ability of the estimator.

Strong, The Management of Business, pp. 168-169.

Quote #11

Most production processes fall into one of the following types or classes:

Extractive: removing raw materials from the land, oceans, or air.

Analytical: breaking up of one substance into several others.

Synthetic: combining several raw materials into one product.

Fabricating: changing or converting materials into different forms.

Musselman and Hughes, An Introduction to Modern Business, p. 308.

Quote #12

Manufacturing enterprises may be classified as follows:

1. Analytical industries: one in which raw materials are broken down into component parts.
2. Synthetical industries: (Opposite of analytical -- puts together) combines primary elements of raw materials into new products.
3. Processing industries: is one that "works over" raw materials to bring out their essential usefulness.
4. Fabrication industries: (put together many parts into a whole) one that takes materials already manufactured and combines them into new products more complicated than any of its parts.
5. Integrated industries: contains more than one of the above.
6. Construction industries: (Fabrication industry on a large scale) Deals with building or creating -- erection of buildings, dams, roads, etc.

Jucius and Terry, *Introduction to Business*, p. 308.

Quote #13

Types of Production:

Continuous: those operations carried on day after day without interruption.

Intermittent: inevitable when the demand for a particular product is not great enough to occupy the full-time of a feasible manufacturing setup.

1. Project: one-of-a-kind system: such as material handling systems, solvent-recovery systems.
2. Job lot: production of a limited number of items. The job lot may be repeated from time to time or never repeated.
3. Batch: production of a quantity of liquids.

MacNiece, *Production Forecasting, Planning, and Control*, p. 18.
Roscoe, *Organization for Production*, p. 144.

Quote #14

Quality control means the recognition and removal of identifiable causes of defects and variations from the set standards.

Inspection: is the application of tests and measuring devices to compare products and performances with specified standards.

Shubin, Business Management, p. 161

Quote #15

Through quality control and inspection, management gains five benefits:

1. Adequate maintenance of quality necessary to satisfy customers and to meet the competition of rival producers.
2. Uniform quality of work necessary for the interchangeable-parts method of manufacture.
3. Economical production achieved through the reduction of defective work and the consequent increase in utilization of facilities and labor.
4. Prevention of waste of labor and machine time on work already known to be defective.
5. The required checking of the work necessary for piece-rate compensation.

Shubin, Business Management, p. 162.

PRODUCTION

INDEX TO TRANSPARENCIES

A. Production

B. Production Sub Functions

C. Production Planning and Control

D-1. Production Forecasting, Planning and Control

D-2. Production Forecasting, Planning and Control

D-3. Production Forecasting, Planning and Control

E. Production Phasing

F. Scheduling of Job Order

G. Equipment Layout

H. Process Layout

I. Line Layout

J. Process Flow Chart

K. Time Study Form

L-1. Standard Time Values for "Placement" Movements

L-2. Standard Time Values for "Getting" Movements

PRODUCTION

DEVELOPING THE MOST ECONOMICAL METHODS AND PLANS FOR MANUFACTURING AUTHORIZED PRODUCTS; COORDINATING THE REQUIRED MANPOWER; SECURING AND COORDINATING MATERIALS, TOOLS, FACILITIES, AND UTILITIES; PRODUCING PRODUCTS; AND CONSIGNING THEM TO THE MARKETING ACTIVITY OR CUSTOMER.

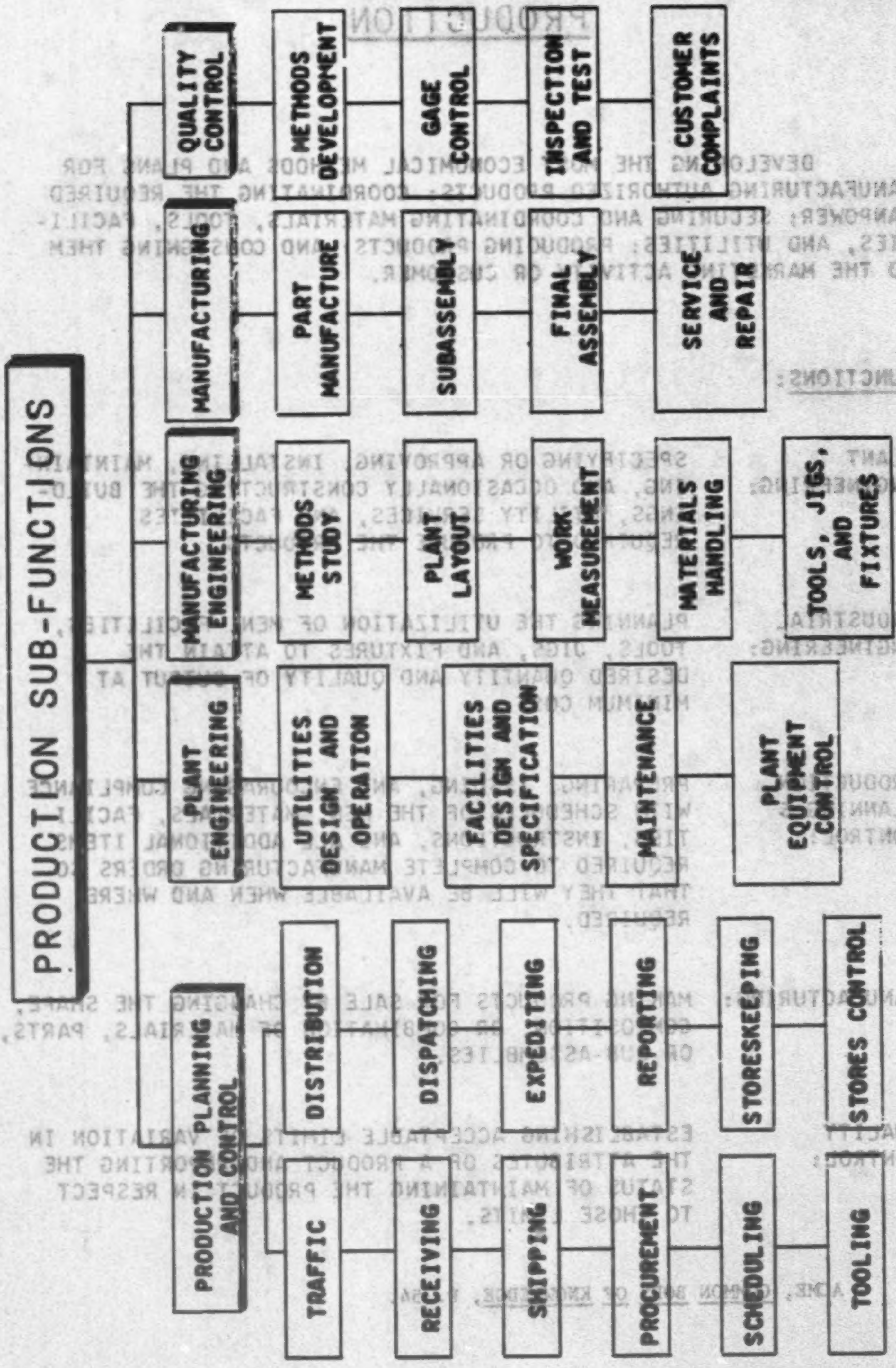
FUNCTIONS:

PLANT ENGINEERING:	SPECIFYING OR APPROVING, INSTALLING, MAINTAINING, AND OCCASIONALLY CONSTRUCTING THE BUILDINGS, UTILITY SERVICES, AND FACILITIES REQUIRED TO PRODUCE THE PRODUCTS.
INDUSTRIAL ENGINEERING:	PLANNING THE UTILIZATION OF MEN, FACILITIES, TOOLS, JIGS, AND FIXTURES TO ATTAIN THE DESIRED QUANTITY AND QUALITY OF OUTPUT AT MINIMUM COST.
PRODUCTION PLANNING & CONTROL:	PREPARING, ISSUING, AND ENCOURAGING COMPLIANCE WITH SCHEDULES OF THE MEN, MATERIALS, FACILITIES, INSTRUCTIONS, AND ALL ADDITIONAL ITEMS REQUIRED TO COMPLETE MANUFACTURING ORDERS SO THAT THEY WILL BE AVAILABLE WHEN AND WHERE REQUIRED.
MANUFACTURING:	MAKING PRODUCTS FOR SALE BY CHANGING THE SHAPE, COMPOSITION, OR COMBINATION OF MATERIALS, PARTS, OR SUB-ASSEMBLIES.
QUALITY CONTROL:	ESTABLISHING ACCEPTABLE LIMITS OF VARIATION IN THE ATTRIBUTES OF A PRODUCT AND REPORTING THE STATUS OF MAINTAINING THE PRODUCT IN RESPECT TO THOSE LIMITS.

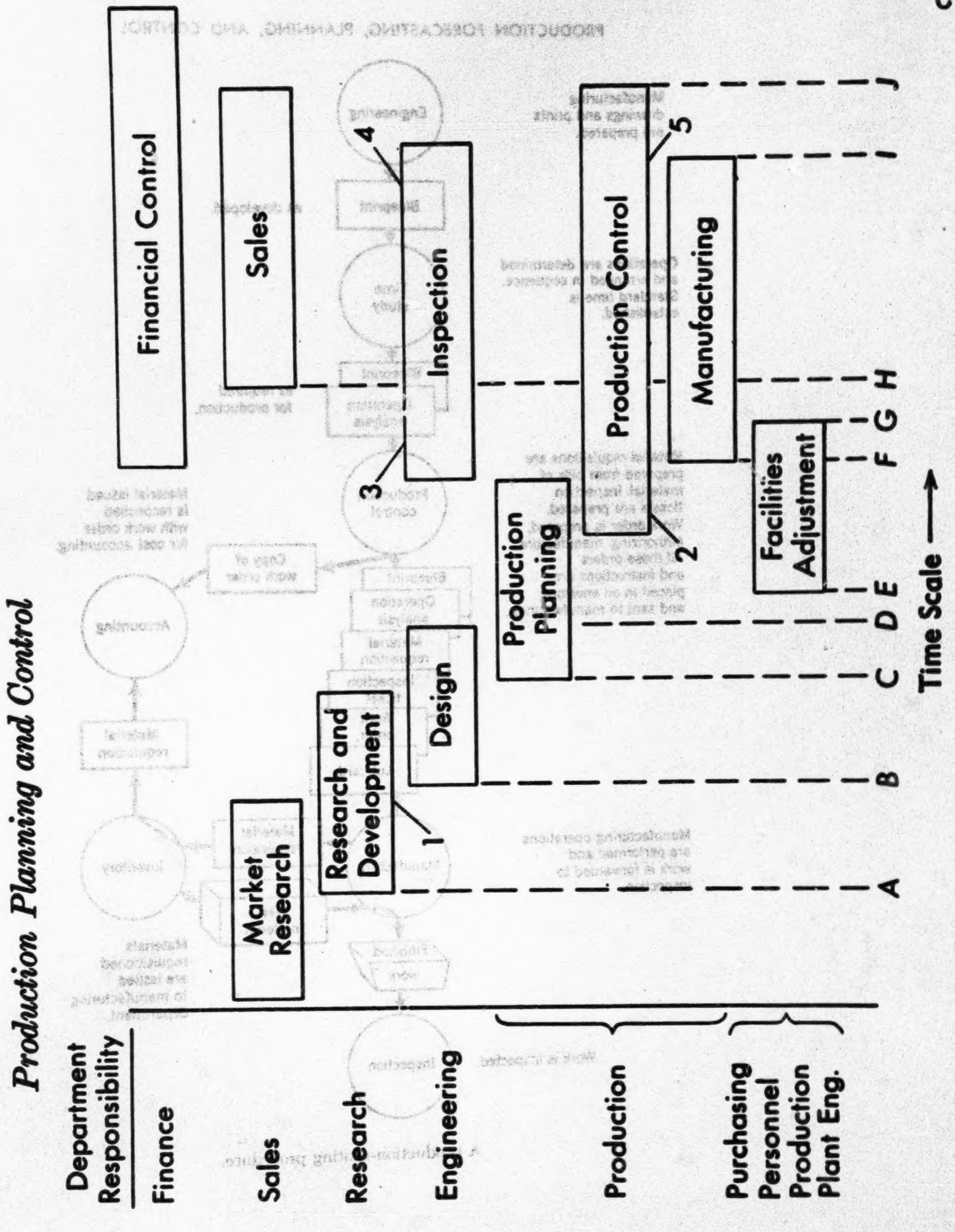
ACME, COMMON BODY OF KNOWLEDGE, P. 54.

A

B


PRODUCTION SUB-FUNCTIONS
PRODUCTION PLANNING AND CONTROL
TRAFFIC
RECEIVING
SHIPPING
PROCUREMENT
SCHEDULING
TOOLING
DISTRIBUTION
DISPATCHING
EXPEDITING
REPORTING
STOREKEEPING
STORES CONTROL
PLANT ENGINEERING
UTILITIES DESIGN AND OPERATION
FACILITIES DESIGN AND SPECIFICATION
MAINTENANCE
PLANT EQUIPMENT CONTROL
MANUFACTURING ENGINEERING
METHODS STUDY
PLANT LAYOUT
WORK MEASUREMENT
MATERIALS HANDLING
TOOLS, JIGS, AND FIXTURES
MANUFACTURING
PART MANUFACTURE
SUBASSEMBLY
FINAL ASSEMBLY
SERVICE AND REPAIR
QUALITY CONTROL
METHODS DEVELOPMENT
GAGE CONTROL
INSPECTION AND TEST
CUSTOMER COMPLAINTS

ACME, COMMON BODY OF KNOWLEDGE, P. 43.



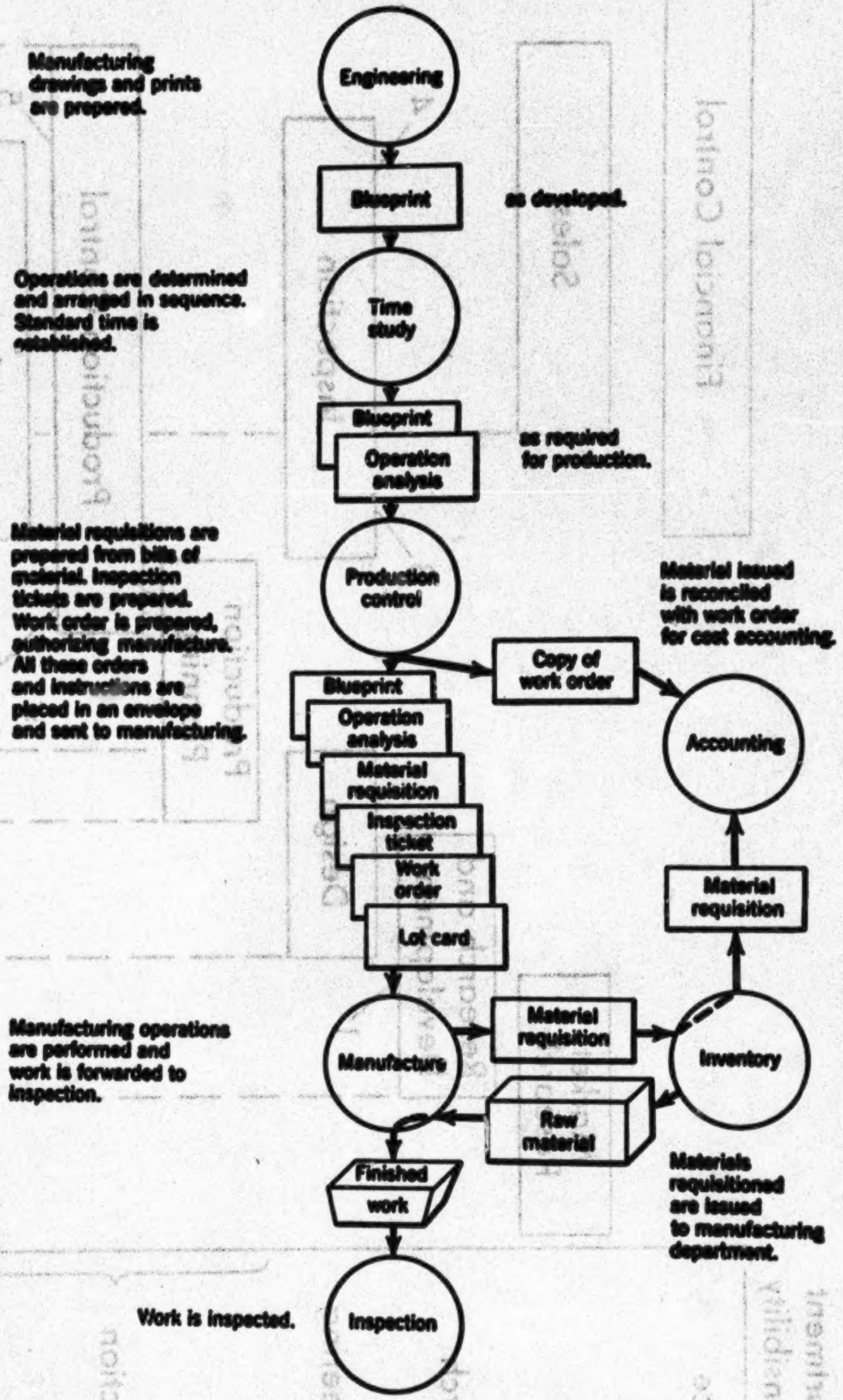
Production Planning and Control

Department Responsibility
Finance
Sales
Research
Engineering
Production
Purchasing
Personnel
Production
Plant Eng.
Financial Control
Sales
Market Research
Research and Development
Design
Inspection
Production Planning
Production Control
Manufacturing
Facilities Adjustment
1
2
3
4
5
A
B
C
D
E
F
G
H
I
J
Time Scale →

EILON, ELEMENTS OF PRODUCTION PLANNING AND CONTROL, P. 40.

D-1

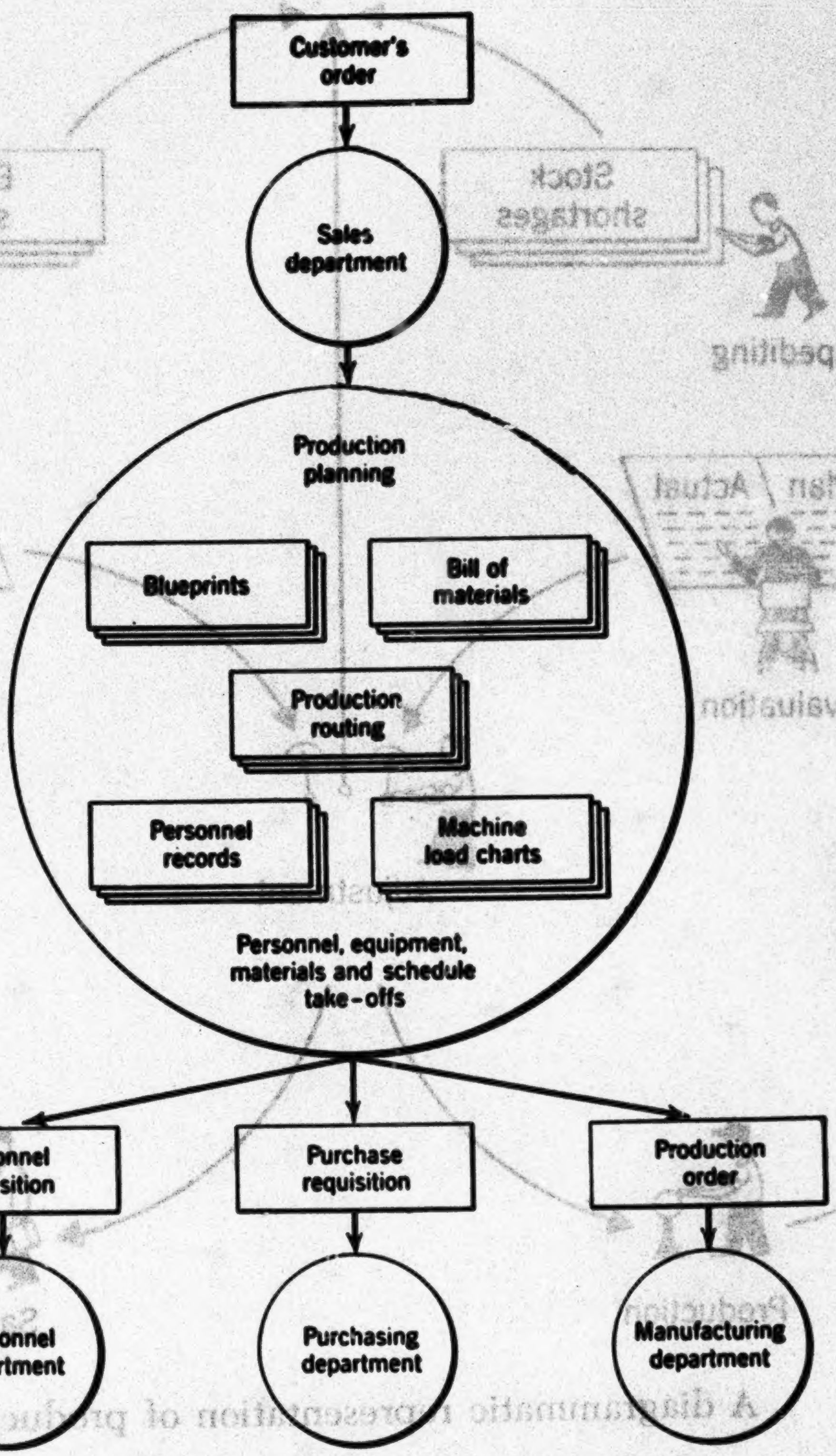
PRODUCTION FORECASTING, PLANNING, AND CONTROL


Manufacturing drawings and prints are prepared.
Engineering
Blueprint
as developed.
Operations are determined and arranged in sequence. Standard time is established.
Time study
Blueprint
Operation analysis
as required for production.
Material requisitions are prepared from bills of material. Inspection tickets are prepared. Work order is prepared, authorizing manufacture. All these orders and instructions are placed in an envelope and sent to manufacturing.
Production control
Copy of work order
Material issued is reconciled with work order for cost accounting.
Accounting
Blueprint
Operation analysis
Material requisition
Inspection ticket
Work order
Lot card
Material requisition
Manufacturing operations are performed and work is forwarded to inspection.
Manufacture
Material requisition
Inventory
Raw material
Finished work
Materials requisitioned are issued to manufacturing department.
Work is inspected.
Inspection

A production-routing procedure.

Source: MacNiece, *Production Forecasting, Planning Control*, pg. 162

D-2

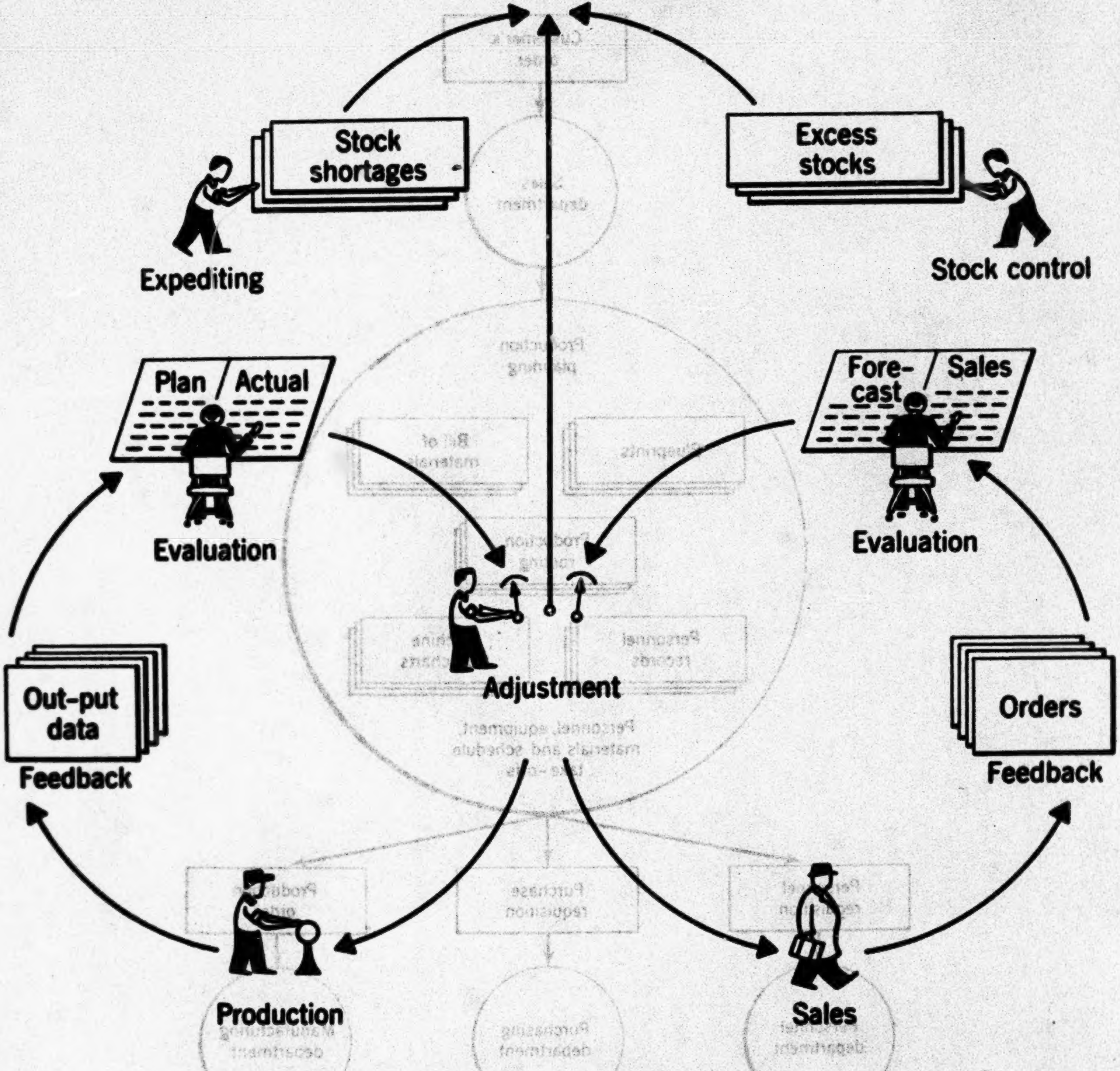

Customer's order
Sales department
Production planning
Blueprints
Bill of materials
Production routing
Personnel records
Machine load charts
Personnel, equipment, materials and schedule take-offs
Personnel requisition
Purchase requisition
Production order
Personnel department
Purchasing department
Manufacturing department

General arrangement for job-order planning.

Source: MacNiece, Production Forecasting, Planning and Control, pg. 22

D-3

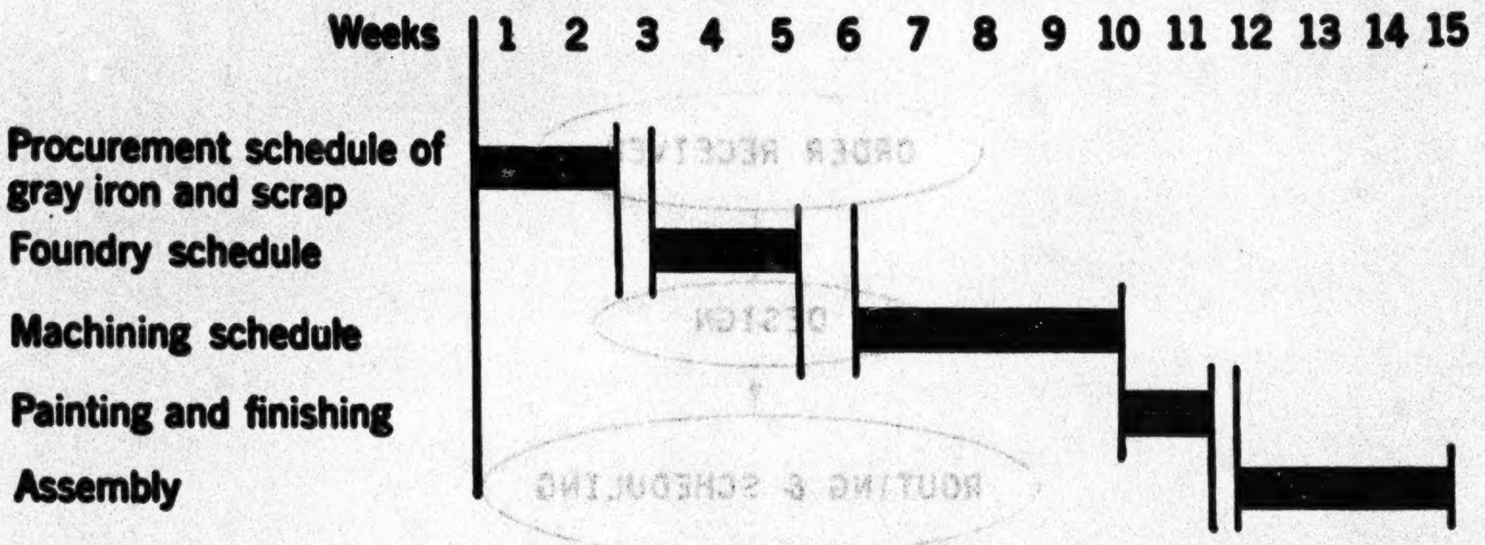
PRODUCTION FORECASTING, PLANNING, AND CONTROL


Stock shortages
Expediting
Excess stocks
Stock control
Plan / Actual
Evaluation
Fore-cast / Sales
Evaluation
Adjustment
Out-put data
Feedback
Orders
Feedback
Production
Sales

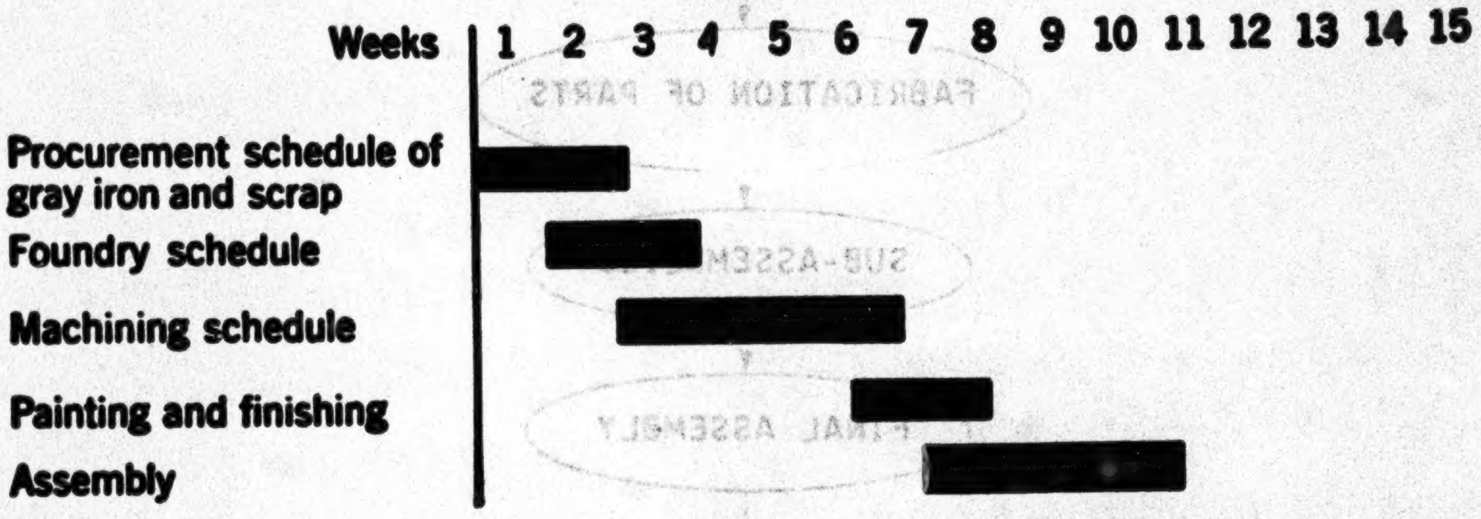
A diagrammatic representation of production control.

Source: MacNiece, Production Forecasting, Planning and Control, pg. 152

PRODUCTION PHASING



Gap phasing.

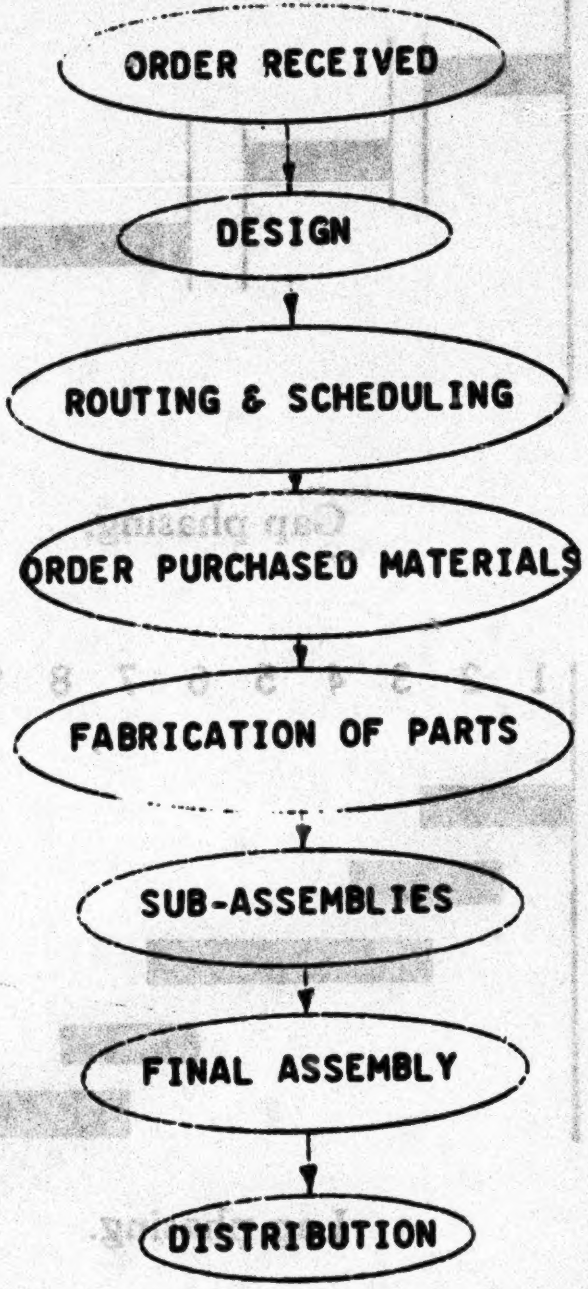


Lap phasing.

Source: MacNiece, Production Forecasting, Planning and Control, pg. 223

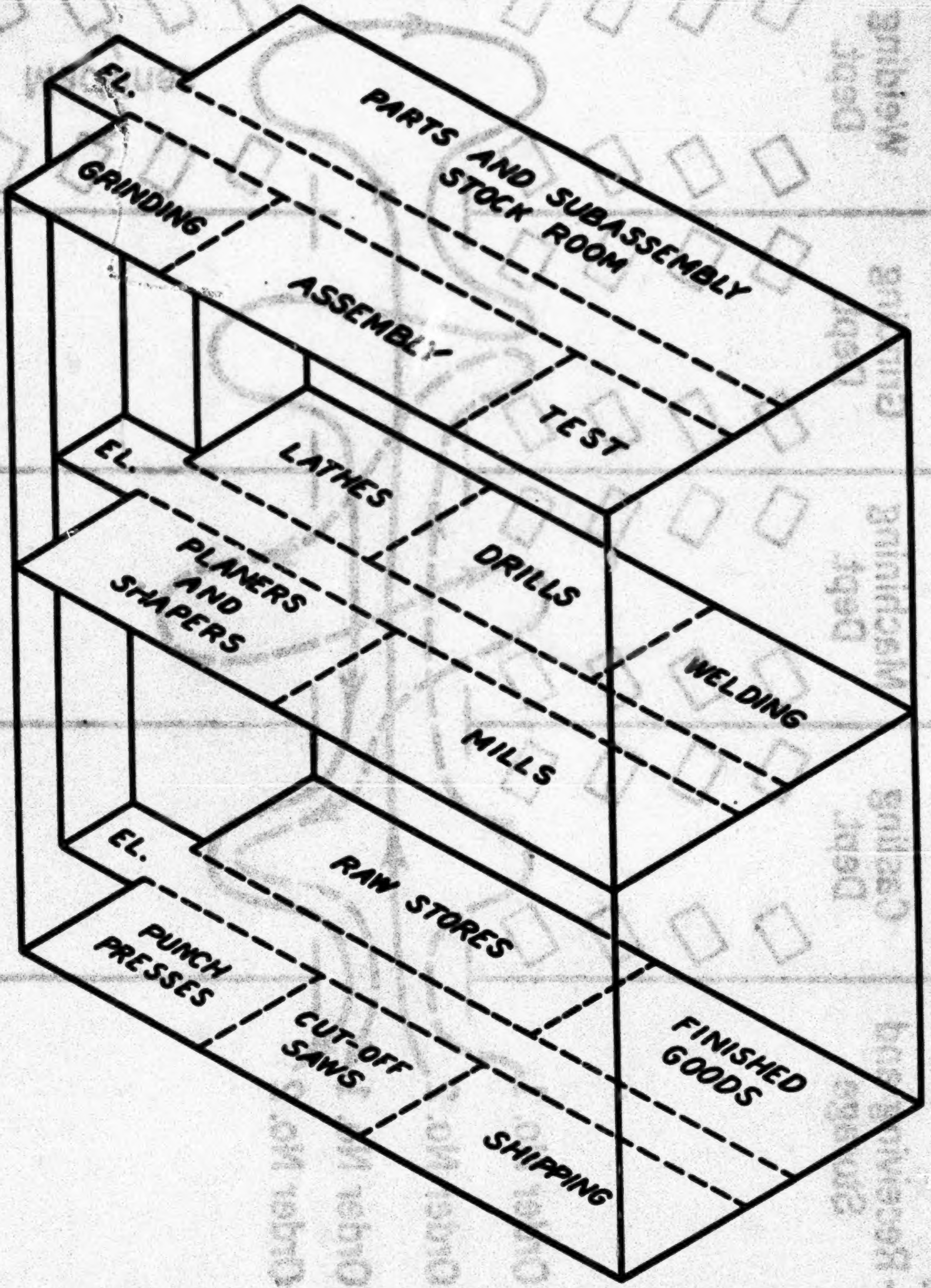
F

Scheduling of Job Order


ORDER RECEIVED
DESIGN
ROUTING & SCHEDULING
ORDER PURCHASED MATERIALS
FABRICATION OF PARTS
SUB-ASSEMBLIES
FINAL ASSEMBLY
DISTRIBUTION

MACNIECE, PRODUCTION FORCASTING, PLANNING AND CONTROL, P. 215.

EQUIPMENT LAYOUT

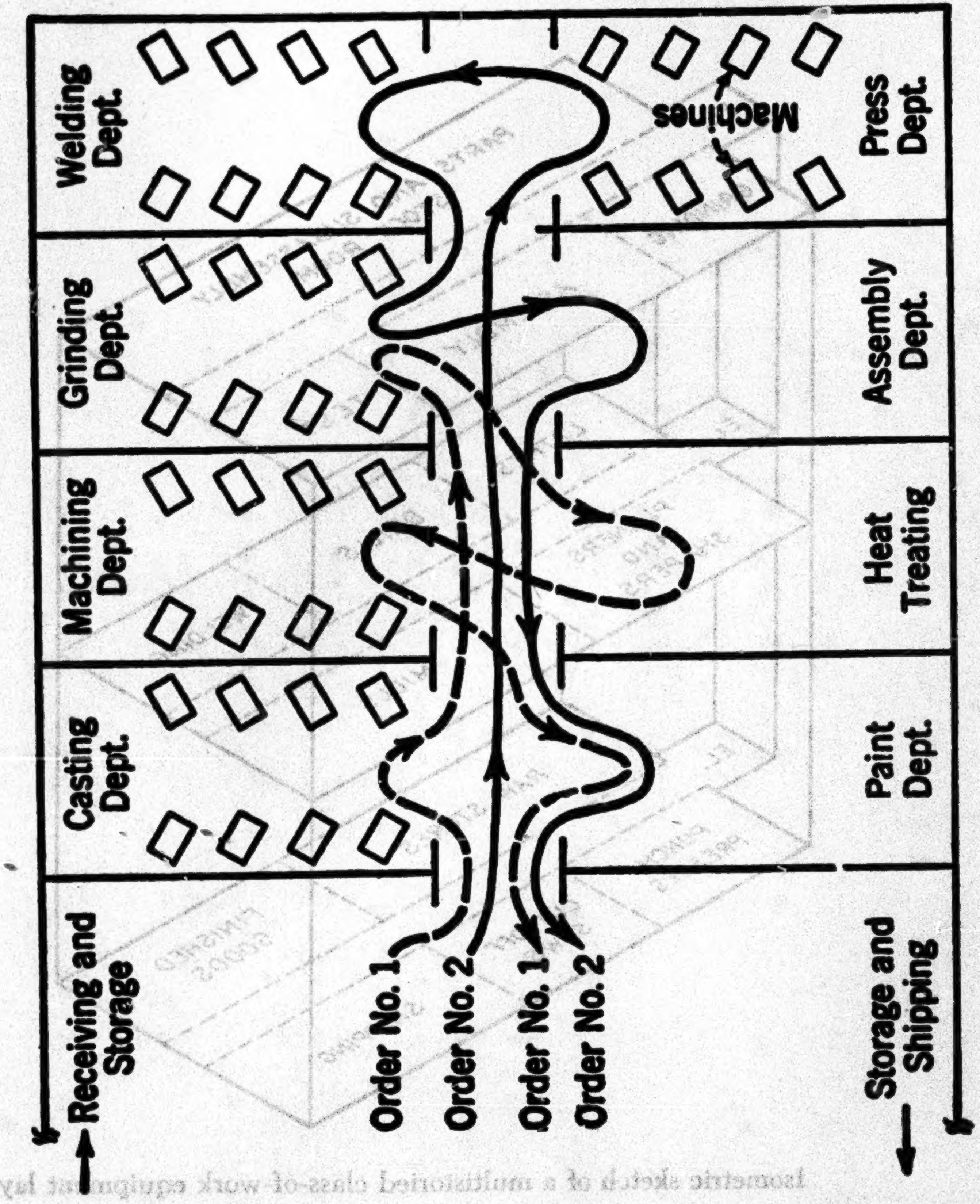

EL.
PARTS AND SUBASSEMBLY STOCK ROOM
GRINDING
ASSEMBLY
TEST
EL.
LATHES
DRILLS
PLANERS AND SHAPERS
WELDING
MILLS
EL.
RAW STORES
PUNCH PRESSES
CUT-OFF SAWS
FINISHED GOODS
SHIPPING

Isometric sketch of a multistoried class-of-work equipment layout.

Source: MacNiece, Production Forecasting, Planning and Control, pg. 74

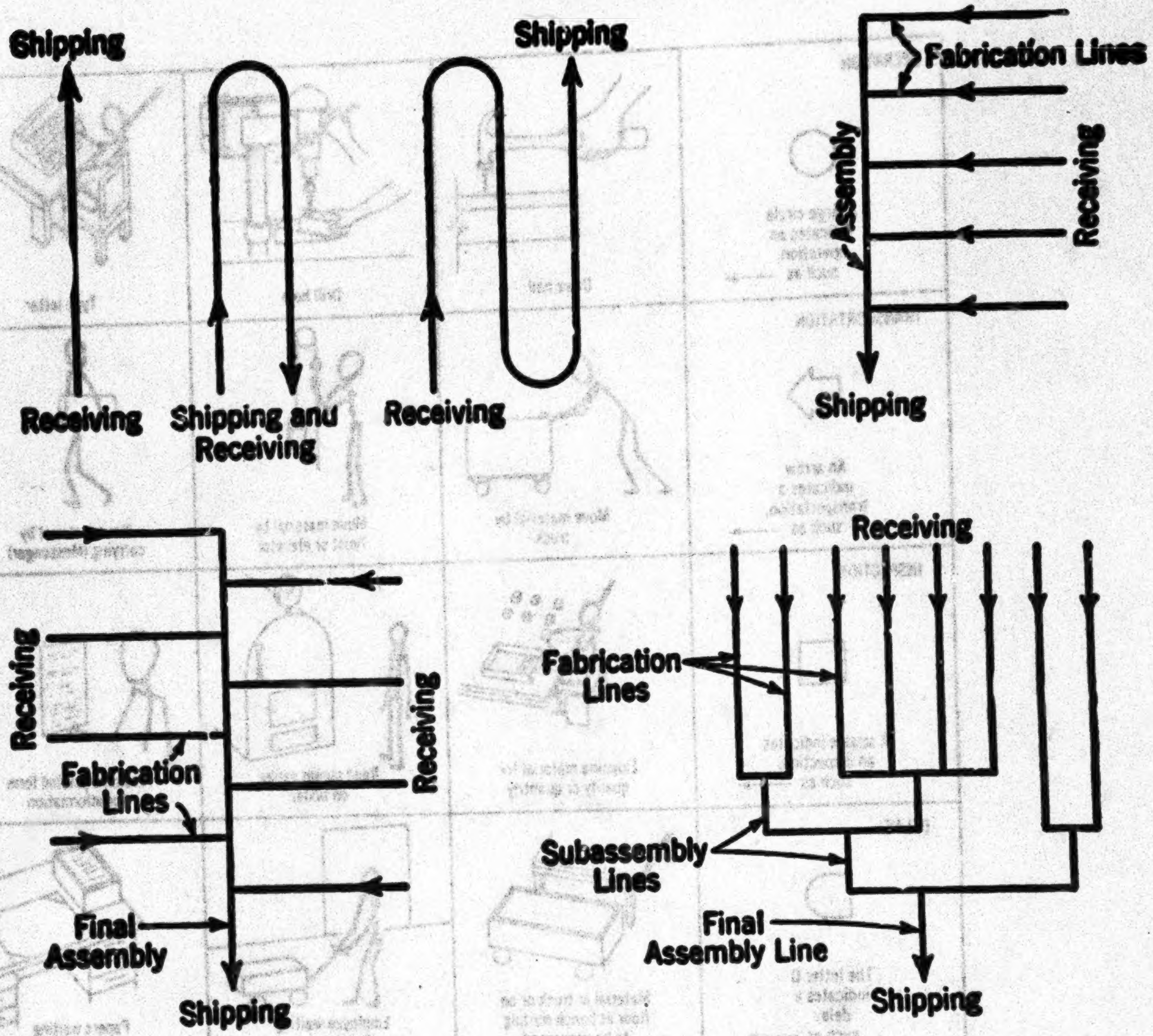
H

PROCESS LAYOUT


Receiving and Storage
Casting Dept.
Machining Dept.
Grinding Dept.
Welding Dept.
Machines
Press Dept.
Assembly Dept.
Heat Treating
Paint Dept.
Storage and Shipping
Order No. 1
Order No. 2
Order No. 1
Order No. 2

SHUBIN, BUSINESS MANAGEMENT, P. 144.

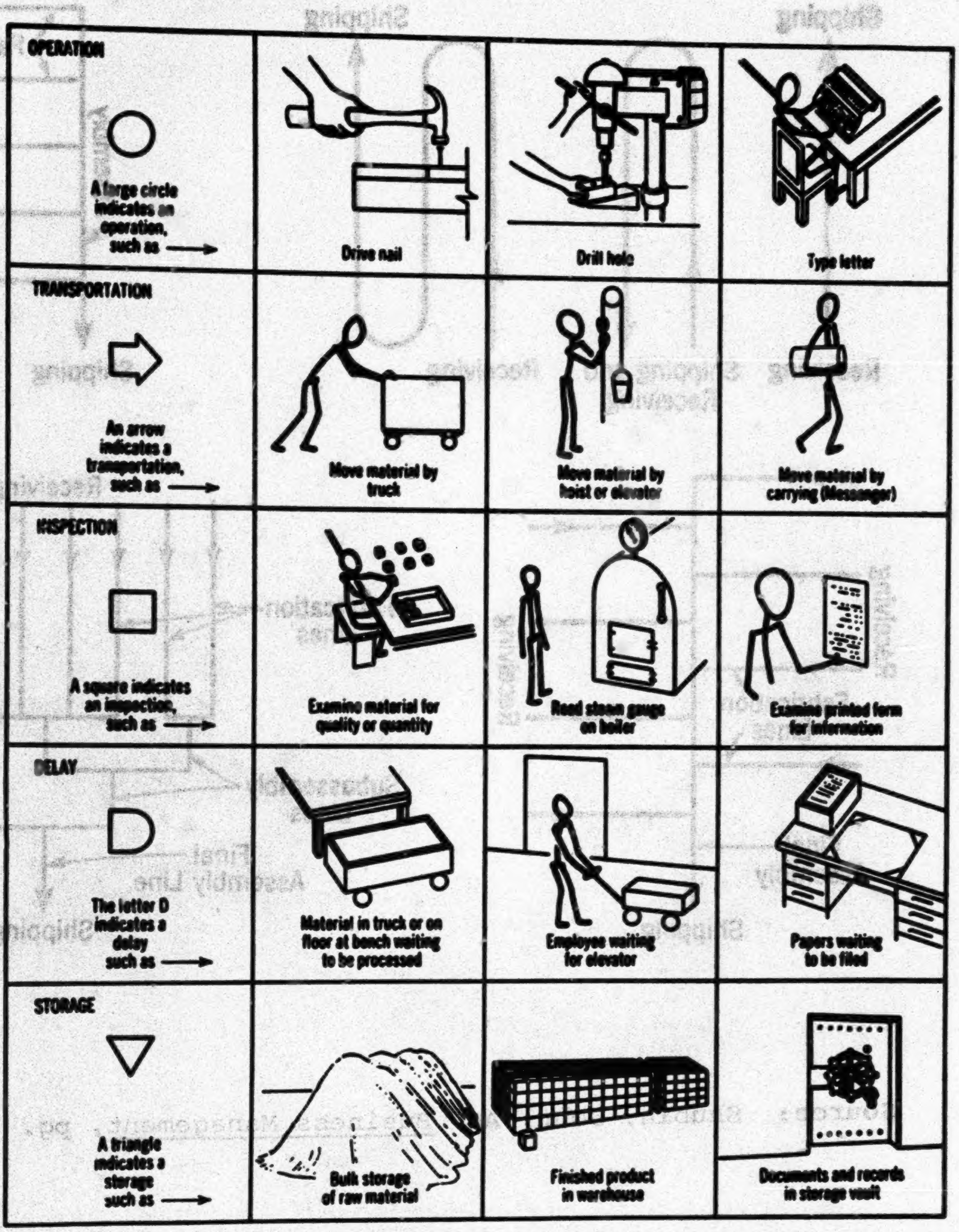
LINE LAYOUTS


Shipping
Receiving
Shipping and Receiving
Shipping
Receiving
Fabrication Lines
Assembly
Receiving
Shipping
Receiving
Receiving
Fabrication Lines
Final Assembly
Shipping
Receiving
Fabrication Lines
Subassembly Lines
Final Assembly Line
Shipping

Source: Shubin, John, A. Business Management, pg. 144

J

PROCESS FLOW CHART


OPERATION
A large circle indicates an operation, such as →
Drive nail
Drill hole
Type letter
TRANSPORTATION
An arrow indicates a transportation, such as →
Move material by truck
Move material by hoist or elevator
Move material by carrying (Messenger)
INSPECTION
A square indicates an inspection, such as →
Examine material for quality or quantity
Read steam gauge on boiler
Examine printed form for information
DELAY
The letter D indicates a delay such as →
Material in truck or on floor at bench waiting to be processed
Employee waiting for elevator
Papers waiting to be filed
STORAGE
A triangle indicates a storage such as →
Bulk storage of raw material
Finished product in warehouse
Documents and records in storage vault

BARNES, MOTION AND TIME STUDY DESIGN AND MEASUREMENT OF WORK, FIG. 22, P. 65

K

TIME STUDY FORM

e Dept. Foreman ☐ Female ☐ Male Clock No.

of Operator Code

duct Part

ration Die No.

EJECTION	HAND	AIR	MECH.
		STR.	INCLINED

erial

hine No. Feed Speed Type of Machine

e By Checked By Time Started Time Finished Elapsed Time

ELEMENTS OF OPERATION	TIME & NO. OF UNITS	OBSERVATIONS (DECIMAL) 1	2	3	4	5	6	7	8	9	10	TOTAL	ELEMENTAL DETERMINATION AVERAGE	MINIMUM	SYNTHETIC	OCCUR. PER — 1 — UNIT	GRADE	STANDARD T. S. T. PER UNIT
	T																	
	NO.																	
	T																	
	NO.																	
	T																	
	NO.																	
	T																	
	NO.																	
	T																	
	NO.																	
	T																	
	NO.																	
	T																	
	NO.																	
	T																	
	NO.																	
	T																	
	NO.																	
	T																	
	NO.																	

EET NO. OF SHEETS — TIME STUDY NO.

— SUMMARY

L	Base Rate	
M	Total Normal	
N	Rest and Delay	%
O	M+N	Standard
P	Ox16.67	Std. Hrs./1000 Pcs.
R	1000/P	Pcs./Hr.
S	PxL*	Pc. Wk. Price/1000 P

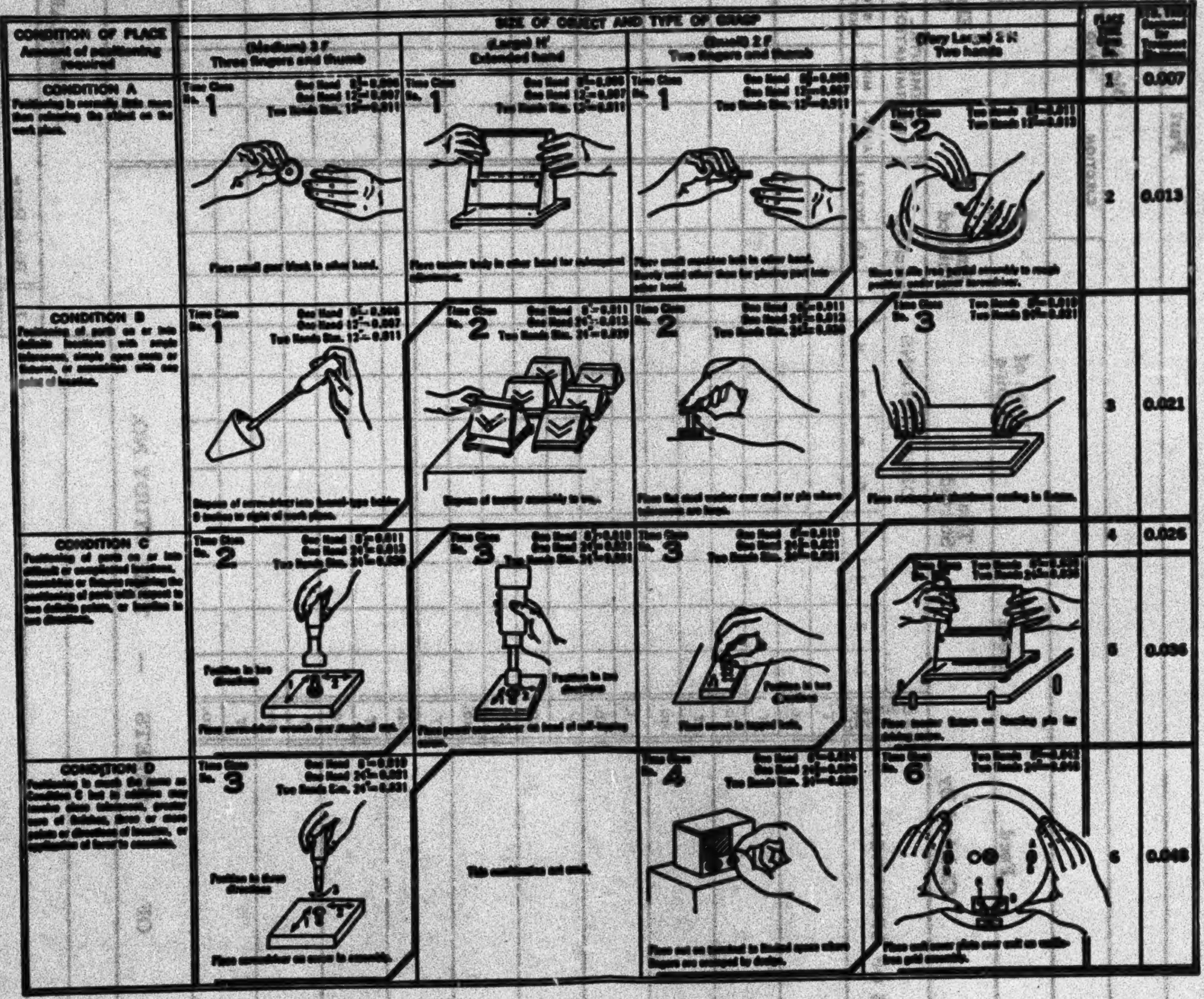
Disposition Of Time Study

Date

C-221

L-1

STANDARD TIME VALUES FOR "PLACEMENT" MOVEMENTS

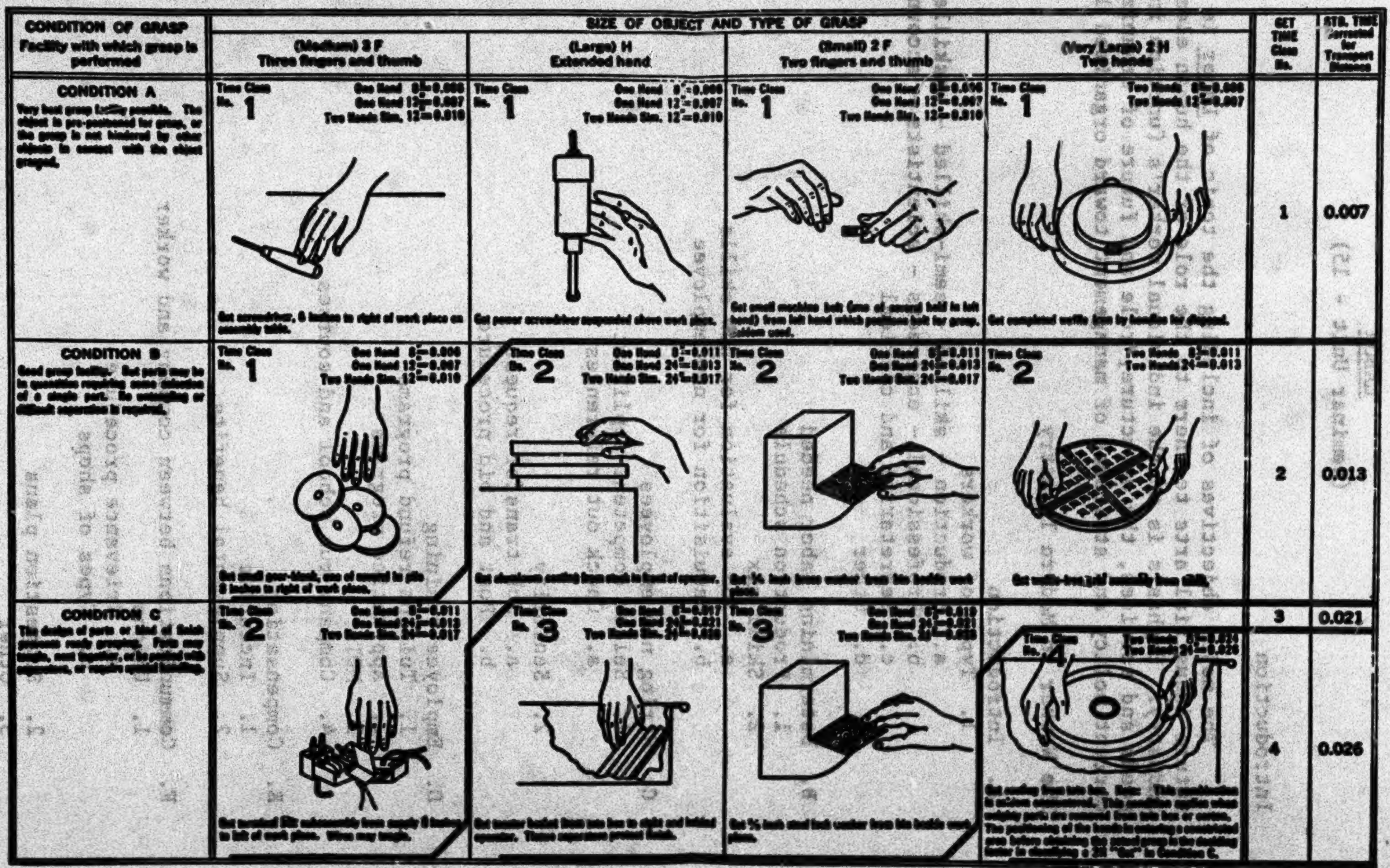

CONDITION OF PLACE
SIZE OF OBJECT AND TYPE OF GRASP
CONDITION A
CONDITION B
CONDITION C
CONDITION D
1
0.007
2
0.013
3
0.021
4
0.026
5
0.036
6
0.048

BARNES, MOTION AND TIME STUDY DESIGN AND MEASUREMENT OF WORK, FIG. 270, P. 482

C-222

L-2

STANDARD TIME VALUES FOR "GETTING" MOVEMENTS


CONDITION OF GRASP
Facility with which grasp is performed
SIZE OF OBJECT AND TYPE OF GRASP
(Medium) 3 F
Three fingers and thumb
(Large) H
Extended hand
(Small) 2 F
Two fingers and thumb
(Very Large) 2 H
Two hands
GET TIME Class No.
STD. TIME Corrected for Transport Distance
CONDITION A
CONDITION B
CONDITION C
Time Class No. 1
One Hand 6"=0.006
One Hand 12"=0.007
Two Hands Sim. 12"=0.010
Two Hands 6"=0.006
Two Hands 12"=0.007
Time Class No. 2
One Hand 6"=0.011
One Hand 24"=0.013
Two Hands Sim. 24"=0.017
Two Hands 6"=0.011
Two Hands 24"=0.013
Time Class No. 3
Time Class No. 4
1
0.007
2
0.013
3
0.021
4
0.026

BARNES, MOTION AND TIME STUDY DESIGN AND MEASUREMENT OF WORK, FIG. 269, P. 482

L-2

LABOR
(Seminar Unit - 15)

I. Introduction

The major objectives of including the topic of Labor is to introduce future industrial arts teachers to the role of the human element in modern industry. Emphasis is on the individual worker's function in producing goods and services, the structure, role and future of organized labor, and current policy and attitudes of management toward organized labor.

II. The Worker in Modern Industry

- A. Introduction
  - 1. Types of workers
    - a. Production - skilled - semi-skilled - unskilled
    - b. Professional - engineers - scientists - accountants
    - c. Secretarial and clerical
    - d. Other

- B. Determining labor needed
  - 1. Production schedule
  - 2. Skill mix
    - a. Job evaluation for new skills
    - b. Requisition for new employee

- C. Hiring new employees
  - 1. Select competent applicant
    - a. Check out references

  - 2. Seniority
    - a. Job transfer request
    - b. Post and bid procedure

- D. Employee training
  - 1. Tuition refund programs
  - 2. Apprentice programs
  - 3. MDTA
  - 4. Company run school and courses

- E. Compensation
  - 1. Incentive
  - 2. Supplemental benefits

- F. Communications between company and worker
  - 1. Unions
    - a. Grievance procedure
    - b. Types of shops

  - 2. Suggestion plans
  - 3. Other

- G. Bargaining
  - 1. Collective
  - 2. Individual

III. Organization of Unions (2:105-129)

- A. Aims of a labor union (Quote #1)
  - 1. Control labor supply
  - 2. Bargain collectively

- B. Types of unions (Quote #2)
  - 1. Craft
    - a. Horizontal type
    - b. A. F. of L.
    - c. Restricts membership to a particular craft

  - 2. Industrial
    - a. Vertical type
    - b. Covers entire plant or industry
    - c. C. I. O.

- C. National AFL-CIO (A) (Example #1)
  - 1. National headquarters
  - 2. Affiliated national and international unions
  - 3. Affiliated state bodies
  - 4. Local bodies
  - 5. Local union

- D. International union (B)
  - 1. Relationship to local
  - 2. Services provided
  - 3. Constitution (Example #1)

- E. Local union
  - 1. Officers (Quote #3)
    - a. President
      - (1) Elected
      - (2) Represents union in various capacities

    - b. Secretary-Treasurer
    - c. Business Agent
      - (1) Usually most powerful officer
      - (2) Represents union in contract administration

    - d. Steward or Committeemen
      - (1) Elected by employees in a department
      - (2) Represents employees in disputes

IV. Types of Union-Security Agreements (5:184-186)

- A. Open shop
  - 1. Both union and non-union workers
  - 2. Collective bargaining optional
  - 3. Membership not a condition of employment

- B. Agency shop
  - 1. All employees pay dues to union
  - 2. Union membership not required

C. Preferential shop
   1. Union members given preference in employment
   2. Union usually supply new workers

D. Union shop
   1. Anyone can work
   2. Union membership required after waiting period of 30 - 90 days

E. Closed shop
   1. Illegal
   2. Only union members could be employed

V. Collective Bargaining (5:180-186) (1:356-367) (3:298-300)

A. Introduction
   1. Kind of negotiation between employer and employee representatives
   2. Purpose
      a. Acts for long range social change
      b. Peace treaty between parties in conflict
      c. Establishes system of industrial jurisprudence

B. Contents of a collective bargaining agreement (Quote #4) (Example #2)
   1. Union recognition and union security
   2. Wage hours and working conditions
   3. Working rules and technological change
   4. Promotion and layoff
   5. Grievance procedure
   6. Fringe benefits
   7. Management prerogatives

C. Bargaining pressures used by labor (Quote #5)
   1. Jurisdictional limitations
   2. Limitations of output
   3. Picketing
   4. Boycott
   5. Strikes

D. Enforcing agreement (4:124-126)
   1. Grievance
      a. Steward-foreman
      b. Union committee - personnel director
      c. International representative - top management
      d. Arbitration

VI. Problems Facing Union (2:3-20 and 81-102) (7:25-48)

A. Unemployment
B. Technological change - automation
C. Discrimination
D. Membership participation
E. Corruption
F. Jurisdictional disputes
G. Government controls

H. Resistance of white collar and professionals to unions
I. Others

VII. Attitudes Toward Unions (7:79-97 and 141-153)

A. By management of organized companies
B. By management of unorganized companies
C. By workers
D. By government (Example #3)
E. By the public

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1. Bornemann, Alfred H., Fundamentals of Industrial Management. Milwaukee, Wisconsin, The Bruce Publishing Co., 1963.

2. Butler, Arthur D., Labor Economics & Institutions. New York, New York, The MacMillan Company, 1961.

3. George, Claude S., Management in Industry. Englewood Cliffs, New Jersey, Prentice Hall, 2nd Edition, 1964.

4. Jucius, J. Michael; and Terry, George R.; Introduction to Business. Homewood, Illinois, Richard D. Irwin Co., Inc., Revised Edition, 1961.

5. Leiter, Robert D., Labor Economics and Industrial Relations. New York, New York, Barnes & Noble, Inc., College Outline Series No. 81, 5th Edition, 1962.

6. Musselman, Vernon A.; Hughes, Eugene H.; Introduction to Modern Business. Englewood Cliffs, New Jersey, Prentice Hall, 1965.

7. Reynolds, Lloyd G., Labor Economics and Labor Relations. Englewood Cliffs, New Jersey, Prentice Hall, 4th Edition, 1964.

LABOR

EXAMPLES

1. Descriptive literature available from AFL-CIO which would explain the structure, constitution, membership, aims and accomplishments of the unions.

2. Descriptive literature or an example of a collective bargaining agreement (contract) to include the following:

   a. recognition
   b. union security
   c. check-off
   d. management responsibilities
   e. union representatives
   f. strikes and lockouts
   g. wages
   h. hours and overtime
   i. job evaluation
   j. wage incentive plan
   k. transfer of employees
   l. grievance procedure
   m. discipline - discharge
   n. seniority
   o. leaves
   p. vacations
   q. insurance and retirement plans
   r. duration of agreement

3. Labor and The Government by J. Woodrow Sayre and Robert E. Rowland, New York State School of Industrial and Labor Relations, Cornell University, Ithaca, New York, 1964.

   This pamphlet describes the historical development of judicial, legislative and executive policies toward unions since the early 1900's. Important legislation is reviewed in the language of the layman including: Norris-LaGuardia Act, National Industrial Recovery Act, National Labor Relations Act, Fair Labor Standards Act, Taft-Hartley Act, and recent amendments.

LABOR

QUOTATIONS

Quote #1

The fundamental aim of a labor union is to control the labor supply available to any given industry, trade, or firm with the objective of representing that labor in collective bargaining with the employer. An underlying concept is to establish the principle of uniformity or standardization of all workers in a group or class who do the same work.

Bornemann, Fundamentals of Industrial Management, p. 361.

Quote #2

Types of Unions:

There is the "craft" union which restricts membership to a particular trade or craft. The American Federation of Labor was essentially an association of crafts. Members of a craft in a given locality would form a "local" union. Locals of the various crafts would form city and state organizations. The ultimate national affiliation was known as the A. F. of L.

The industrial union was exemplified by the CIO. It included within a "local" a variety of trades and occupations and has been strongest in the mass production industries. This all-inclusive basis of organization led it to be known also as a vertical union, in opposition to the horizontal stratification of the craft membership.

Jucius and Terry, Introduction to Business, p. 117

Quote #3

Local unions have a fairly simple organization structure headed by a president. His duties usually consist of presiding over meetings, representing the local union in various capacities, participating in collective bargaining with employers, and the normal administration on the contract agreement.

An elected secretary-treasurer performs the duties usually associated with the office.

A business agent may be elected or appointed; he is usually the most powerful officer in the union because of his intimate knowledge of the problems of the workers and unions and his diverse functions. His chief duty is to represent the union in administration of the contract.

Stewards, or shop committeemen, are usually elected by the employees in a department to represent them in disagreements.

George, Management in Industry, p. 297.

Quote #4

Contents of a collective bargaining agreement:

1. Recognition and union security
    - a. recognizes the union as the representative of the employees
    - b. protects the union in holding its members
2. Wages, hours, and working conditions
    - a. specify the methods of payment
    - b. limitations on hours to be worked in the form of penalty rates for hours worked beyond some specified amount
    - c. a statement of working rules - (working conditions)
3. Working rules and technological change
    - a. protection from automation
4. Promotion and layoff
    - a. generally controlled by the seniority provisions
    - b. provides that worker's ability is considered for promotion within the seniority section of contract
5. Grievance procedure
    - a. serves a judicial function to settle disputes
6. Fringe benefits
    - a. economic rewards received by employees beyond their basic wage rate
7. Management prerogatives
    - a. the right to make decisions without first conferring with the union

Butler, Labor Economics and Institutions, pp. 159-172.

Quote #5

Bargaining pressures used by labor:

Jurisdictional limitations: two types of limitations

1. Type of work performed (union type of work - sheet metal and iron workers)
2. Area in which it is performed (union geographic area)

Limitations of output: set limits of output of each worker based on units of production, tools permitted, or methods used. (Limit size of paint brush used or number of bricks to be laid during a regular working day.)

Picketing: union members carry banners or placards that announce their complaints against the management. The purpose is to inform the public of their case and to enlist sympathy and support.

Boycott: the union's attempt to restrict the patronage of a firm by influencing people to refuse to do business with it.

Strikes: workers refuse to work until their demands are met or a compromise is reached.

Musselman and Hughes, Introduction to Modern Business, pp. 262-263.

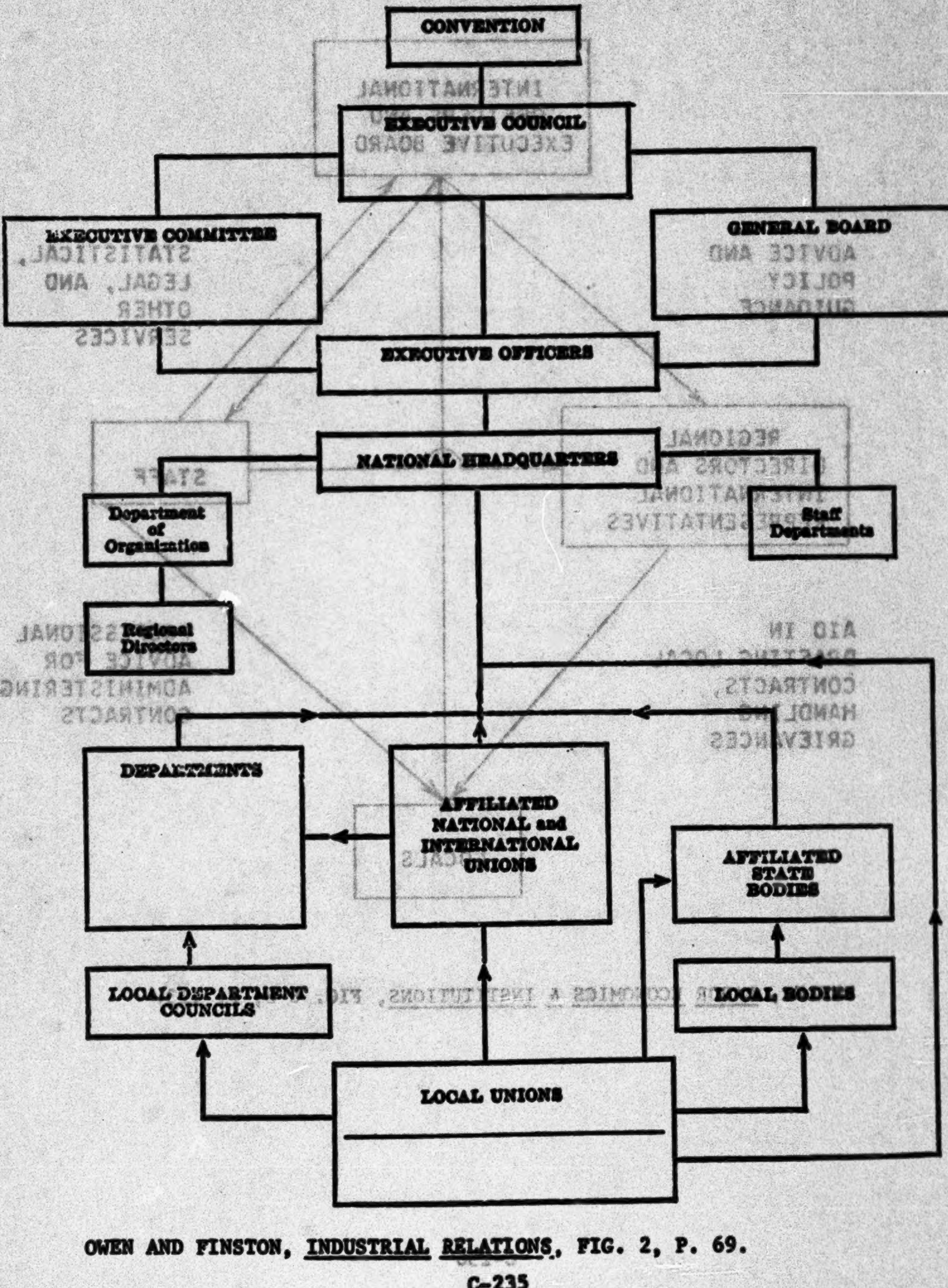
LABOR

INDEX TO TRANSPARENCIES

A. **Structure of AFL-CIO**

B. **Government of Internationals**

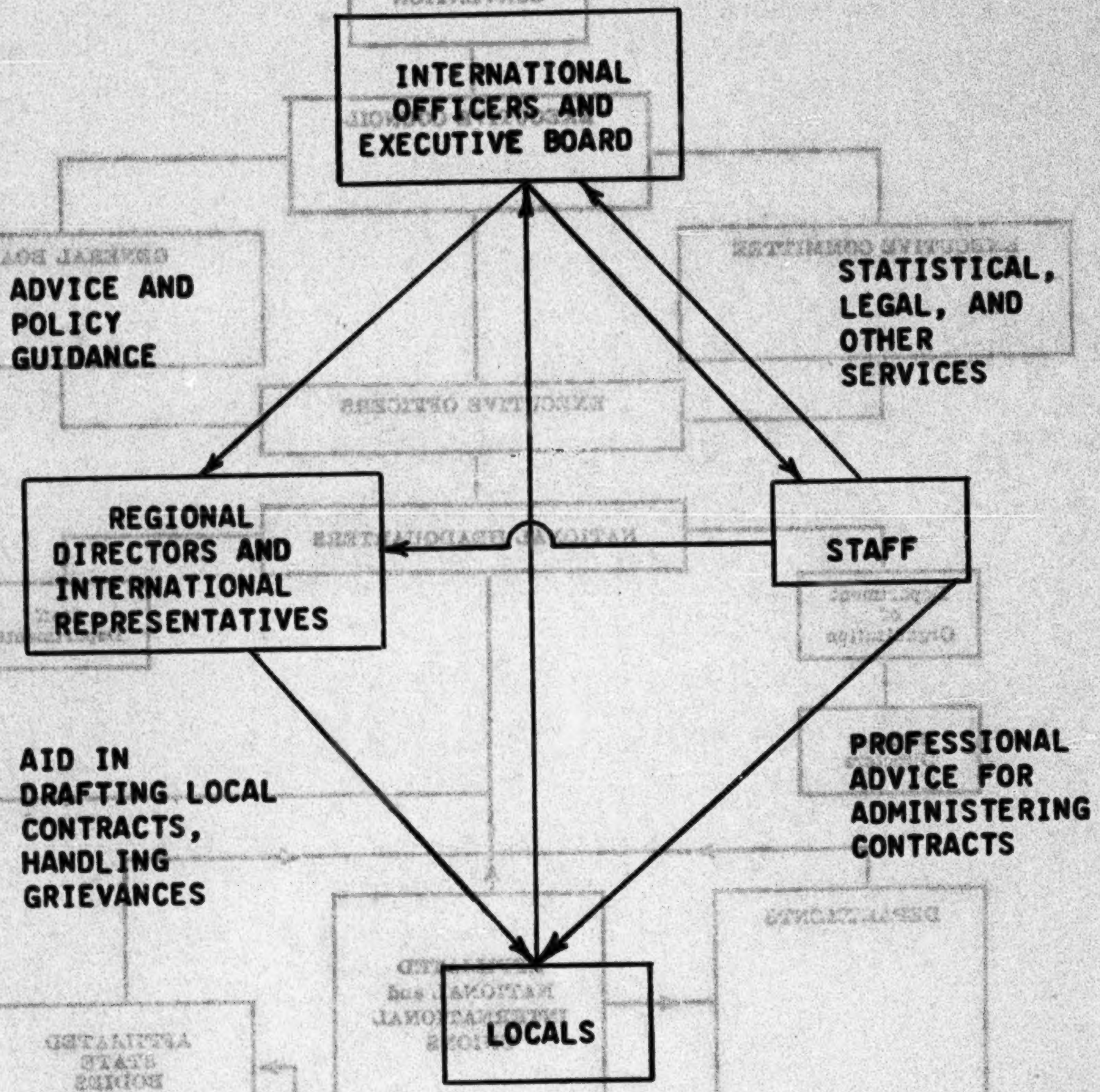
Structure of the AFL–CIO


CONVENTION
EXECUTIVE COUNCIL
EXECUTIVE COMMITTEE
GENERAL BOARD
EXECUTIVE OFFICERS
NATIONAL HEADQUARTERS
Department of Organization
Staff Departments
Regional Directors
DEPARTMENTS
AFFILIATED NATIONAL and INTERNATIONAL UNIONS
AFFILIATED STATE BODIES
LOCAL DEPARTMENT COUNCILS
LOCAL BODIES
LOCAL UNIONS

OWEN AND FINSTON, INDUSTRIAL RELATIONS, FIG. 2, P. 69.

B

GOVERNMENT OF INTERNATIONALS


INTERNATIONAL OFFICERS AND EXECUTIVE BOARD
ADVICE AND POLICY GUIDANCE
STATISTICAL, LEGAL, AND OTHER SERVICES
REGIONAL DIRECTORS AND INTERNATIONAL REPRESENTATIVES
STAFF
AID IN DRAFTING LOCAL CONTRACTS, HANDLING GRIEVANCES
PROFESSIONAL ADVICE FOR ADMINISTERING CONTRACTS
LOCALS

BUTLER, LABOR ECONOMICS & INSTITUTIONS, FIG. 6-B, P. 113.

FINANCE

(Seminar Unit - 16)

I. Introduction

The future Industrial Arts teacher should have a basic understanding of industrial finance which would include the functions of General Accounting, Cost Accounting, Inventory Control, Cash Flow and Raising of Capital. This unit should provide the opportunity for exposure into these areas.

II. What is Financial Management

A. Planning, directing, and measuring the results of company monetary operations.

B. Acquisition and conservation of capital funds. (Quote #1)

III. Organization

A. Functions (A)
  1. Finance
  2. Control
  3. Purchasing (usually under manufacturing department)
  4. Inventory control

B. Sub-Functions (B)
  1. Finance (9:367-368)
    a. Financial planning
    b. Tax management
    c. Financial relations
    d. Custody of funds
    e. Credit and collections
    f. Insurance

  2. Control (5:159-161)
    a. General accounting
    b. Cost accounting
    c. Planning and budgeting
    d. Internal auditing
    e. Systems and procedures

  3. Purchasing (5:193-196; 201-202)
    a. Buying
    b. Purchase expediting
    c. Purchase record and files
    d. Purchase research
    e. Salvage sales

  4. Inventory control (9:488 and 491)
    a. Functions
    b. Types
    c. Techniques
    d. Physical inventory

III. Description of Functions

A. Finance

1. Objectives of financial management (9:367) (7:331-345)
    a. Raising capital
    b. Conserving capital
    c. Making profit

2. Corporation financing (Review) (5:143-146)
    a. Capital
        (1) Types (Quote #2)
            (a) fixed
            (b) working
    b. Sources of capital (C) (9:367-377) (7:21-26)
        (1) Owners capital
            (a) previous sale of securities
            (b) appreciation or depreciation of investments
        (2) Profit
        (3) Sale of securities
            (a) stocks
                1 common
                2 preferred
            (b) bonds
        (4) Loans
            (a) private
            (b) lending institutions
            (c) insurance companies
        (5) Trade credit
    c. Value of securities
        (1) Interpreting financial page (D)

3. Financial statements (4:144) (Example #1)
    a. Purposes
        (1) Use of managers
        (2) Report of stockholders
        (3) Reporting to creditors
        (4) Flotation of securities
        (5) Reporting to government
        (6) General publication

    b. Types
        (1) Balance sheets (E-1 & E-2)
            (a) statement of assets and liabilities
        (2) Income statement (F)
            (a) statement of profit and loss
        (3) Other statements found in an annual report
            (a) yearly comparative statements--growth diagrams
            (b) distribution of sales dollar

4. Cash flow (9:375-377) (5:156-159 & 175)
    a. Circulating capital is invested in labor, materials, and equipment to produce inventory which is sold to pay interest, debts, taxes, and dividends and provide new circulating capital (G)

- b. Total cash resources are used for research, plant equipment, wages and salaries, materials, and services to produce goods which are sold to provide receipts which pay taxes, debt repayment dividends, and new cash resources

B. Control

- 1. Forecasting (Budgeting) (5:150-152)
  - a. Uses of broad forecasts (Quote #3)
    - (1) Financial planning
    - (2) Inventory control
    - (3) Production
    - (4) Sales analysis
    - (5) Planning expansion
    - (6) Product planning
    - (7) Personnel policies
  - b. Budgets (3:517) (8:141) (Example #2)
    - (1) Written plan of action and control devices
    - (2) Functions
      - (a) tools for planning
      - (b) control device
      - OR
      - (a) insure adequate resources
      - (b) provide sufficient resources
      - (c) confine operating expenses
    - (3) Types of budgets (Quote #4)
      - (a) static
      - (b) variable
- 2. Cost control
  - a. Elements of cost (H) (8:143)
    - (1) Material
      - (a) direct
      - (b) indirect (general and selling expense)
    - (2) Labor
      - (a) direct
      - (b) indirect (general and selling expense)
    - (3) Overhead (factory expense)
  - b. Relation of costs to profit (I)
    - (1) Fixed and variable costs relation to profit and loss
    - (2) Breakeven point
  - c. Cost accounting (9:252-271)
    - (1) Department cost accounting
      - (a) direct charges
      - (b) redistributive (indirect) charges
    - (2) Job cost accounting
      - (a) total cost to date
        - 1 company labor
        - 2 outside purchases
        - 3 material
        - 4 outside labor
        - 5 engineering

- (b) material
  - 1 finished product
  - 2 semi-finished product
  - 3 general stores
- (c) productive labor
- (d) die setting
- (e) applied overhead

- d. Maintenance cost accounting

- C. Purchasing
  - 1. Description
    - a. Securing, when required, materials, supplies, equipment and services of proper quality and quantity

    - b. Part of material control which embraces
      - (1) Procurement
      - (2) External transportation
      - (3) Internal transportation
      - (4) Inventory control

  - 2. Purchasing procedure (J-1 & J-2)
    - a. Planning
      - (1) Purchase requisition from department
      - (2) Selection of potential sources of supply

    - b. Purchasing
      - (1) Issuance of request for quotation
      - (2) Receipt and analysis for quotation
      - (3) Selection of right source
      - (4) Determine right price
      - (5) Issuance of purchase order
      - (6) Follow to insure scheduled delivery

    - c. Accounting
      - (1) Analysis of receiving reports (one copy of original purchase order)
      - (2) Pay vendor

    - d. Receiving

  - 3. Types of purchases (Quote #5)
    - a. Group
    - b. Scheduled
    - c. Contract

- D. Inventory control (3:473-474) (7:185)
  - 1. Functions of inventory control
    - a. Procurement
    - b. Maintaining
    - c. Issuing

  - 2. Types of inventory (Quote #6)
    - a. Tools
    - b. Supplies

        - c. Raw materials
        - d. Goods in process
        - e. Finished goods

    - 3. Techniques for keeping inventory
        - a. Perpetual inventory
            - (1) Records receipts
            - (2) Records issues of material
            - (3) Provides balances on hand

        - b. Physical inventory (Quote #7)
            - (1) Checks perpetual inventories
            - (2) Required by taxes
            - (3) Methods
                - (a) continuous
                - (b) periodic
                - (c) annual

IV. Review

- A. Definition and explanation of financial management

- B. Functions
    - 1. Finance
    - 2. Control

    Sometimes

    - 3. Purchasing
    - 4. Inventory

- C. Finance
    - 1. Objectives
        - a. Raise capital
        - b. Conserve capital
        - c. Insure profits

    - 2. Reports
        - a. Income
        - b. Balance

    - 3. Cash flow

- D. Control
    - 1. Budgets
        - a. Functions
            - (1) Tools for planning
            - (2) Control device
        - b. Types
            - (1) Static
            - (2) Variable

    - 2. Cost Control
        - a. Elements of cost

(1) Labor - direct and indirect
(2) Material - direct and indirect
(3) Overhead

E. Purchasing
  1. Procedure
    a. Planning
    b. Purchasing
    c. Accounting
    d. Receiving

F. Inventory control
  1. Functions
    a. Procurement
    b. Maintaining
    c. Issuing

  2. Types of inventory

  3. Techniques
    a. Perpetual inventory
    b. Physical inventory

Bibliography

1. Bethel, Lawrence L.; Atwater, Franklin S.; Smith, George H. E.; Stackman, Harvey A. Jr.; Industrial Organization and Management. New York, N.Y., McGraw-Hill Book Co., Inc., 4th Ed., 1962.

2. Brummet, R. Lee, Cost Accounting for Small Manufacturers. Washington, D.C., Small Business Administration, 1953.

3. George, Claude S. Jr., Management in Industry. Englewood Cliffs, N.J., Prentice-Hall, 2nd Ed., 1964.

4. Harold, Gilbert, Corporation Finance. New York, N.Y., Barnes & Noble, Inc., College Outline Series #7, 3rd Ed., 1956.

5. Hart, Donald J., Business in a Dynamic Society. New York, N. Y., The Macmillan Co., 1964.

6. Reinfeld, Nyles V., Production Control. Englewood Cliffs, N.J., Prentice-Hall, 1959.

7. Shubin, John A., Business Management. New York, N.Y., Barnes & Noble, Inc., College Outline Series #92, 1965.

8. Strong, Earl P., The Management of Business. New York, N.Y., Harper & Row, 1965.

9. Wheeler, Bayard O., Business An Introductory Analysis. New York, N.Y., Harper & Row, 1962.

FINANCE

EXAMPLES

1. **Financial Statement** (or Annual Report) of a company.

   To include the following data:
   - a. balance sheet
   - b. general condition of the company
   - c. future important information about the company especially new products, new inventions, price changes of products or materials, etc.
   - d. recent acquisition information.

2. **Departmental Budget** (see attached example).

R. E. DIETZ COMPANY

Departmental Budget

Department # ____________ Foreman ______________________________ Month of ______________

Prepared by ____________________ @ ______ Days

1) SUMMARY: A) Budget for Month

1. Variable ______ % $ ______________
2. Fixed $ ______________
3. Total Budget $ ______________

B) Budget Performance

1. Variable _____ % $ ______________
2. Fixed $ ______________
3. Total Performance $ ______________

C) Deviation From Budget (see note*)

1. Variable _____ % $ ______________
2. Fixed $ ______________
3. Total Deviation $ ______________

______ %

*NOTE:
"+" Designates over budget
"-" Designates under budget

II) DETAIL:

A) Productive Labor Piece Work (Codes 2 and 4))
Productive Labor D.W. (Codes 1 & 3) Dept. 41) $ ______________
($ ______ / Day)

B) Variable Classification Costs	Code #	Budget %	Budget $	Performance %	Performance $	Deviation %	Deviation $
Off Standard x 1/2	51 & 53						
Production Repair	52 & 54						
Die Set and Set Up	5 & 6						
Die Inspection	25						
Make up Pay - Oper. Res.	28 & 30						
Make up Pay - Not oper. res.	29 & 31						
Idle Time	38 & 39						
Day Work Excess	41						
Hourly Rated Jobs	1 & 3						
Total							

C) Fixed Classification Costs	Code #	Budget $	Performance $	Deviation $
Trucking	22			
Foreman	11 & 27			
Changeover	61 & 62			
Stock Repair	65 & 66			
Returned Goods Repair	67 & 68			
Building Service	18			
Handle Scrap	21			
Total				

Note: See WSP 1E - 1A for detail of Code Number Charges

C-245

FINANCE

QUOTATIONS

Quote #1

Business finance is defined as that business activity which is concerned with the acquisition and conservation of capital funds in meeting needs and over-all objectives of business enterprises.

Wheeler, *Business*: *An Introductory Analysis*, p. 368.

Quote #2

Examples of fixed capital and working capital classifications:

Fixed Capital	Working Capital
Land	Cash
Buildings	Raw materials
Machinery	Parts for assembly
Office Equipment	Finished goods inventory
Furniture	Office supplies
Trucks	Expendable tools and machine parts
Railroad Cars	Accounts receivable
Professional libraries	Work in progress
Professional instruments	

Hart, *Business in a Dynamic Society*, p. 146.

Quote #3

There are seven management regions for which forecasts provide necessary information:

1. Financial planning: permits an evaluation of expenses against profits.
2. Inventory control: permits better controls and fewer stockouts.
3. Production control: allows for better use of equipment, control of costly overtime, better employee morale, better control of in-work inventory, and better deliveries.
4. Sales analysis: provides a yardstick for measuring sales territories.
5. Planning expansion: predicts future growth needs.
6. Product planning: identifies products which are profitable and ones which should be dropped by means of cost estimates based on forecasts.
7. Personnel policies: forecasts can be used to set up training programs or similar personnel programs as indicated.

Reinfeld, Production Control, p. 90.

Quote #4

There are two principle types of budgets:

Static or fixed budget: depends on the ability to predict income, sales, or shipments with a reasonable degree of accuracy. Using this prediction as a base, fixed sums are allocated for expenditures with a fixed budget of production operations for the period in question.

Variable budget: recognizes the unreliability of income and sales predictions and makes provisions in advance for variations in production and expenditures in accordance with variations in sales.

Bethel and others, Industrial Organization and Management, pp. 569-570.

Quote #5

Forms in which purchases are made include the following:

Group purchasing: a sound policy for the procurement of goods bought in small quantities. Savings in clerical and delivery costs are made when one order is placed for a number of varied small items instead of an individual order for each type of item.

Schedules purchasing: the supplier is given estimates of procurement needs covering a period of time; he can then effectively plan his production on a long-term basis. Both vendor and buyer enjoy the savings resulting from regularity of production and smaller inventories.

Contract purchasing: a contract specifying periodic delivery can assure a continuous supply of goods and also obtain price advantages. Under contract purchasing both buyer and vendor avoid tying up funds in large inventories. Lower prices are obtained through quantity discounts and greater bargaining.

Shubin, Business Management, pp. 176-177.

Quote #6

Types of Inventory:

Tools: include fixtures, dies, patterns, guages, and "hand tools" used with machines and operations.

Supplies: items used to aid production but do not go into the product.

Raw materials: commodities and purchased parts that go into the final product.

Goods in process: materials that have been partly fabricated but not yet completed.

Finished goods: completed items ready for shipment.

Shubin, Business Management, p. 185.

Quote #7

Since discrepancies between inventory records and quantities on hand cannot be avoided, an actual count on the items at hand is periodically necessary for effective inventory control and is required for tax purposes.

Methods:

Continuous count of balance at hand -- items approaching order point are counted by a few specially trained men.

Periodic count -- all inventories group by type are regularly counted by trained personnel at least once a year.

Annual or semi-annual total count -- all stocks are counted annually or semi-annually at one time.

Shubin, Business Management, p. 188.

FINANCE

INDEX TO TRANSPARENCIES

A. **Functions of Financial Control**

B. **Sub-Functions of Financial Control**

C. **The Sources of Capital Financing**

D. **How to Read the Financial Page of Your Newspaper**

E-1. **Consolidated Balance Sheet (Assets)**

E-2. **Consolidated Balance Sheet (Liabilities & Equity)**

F. **Statement of Consolidated Income**

G. **Cash Flow**

H. **The General Components of Cost**

I. **Relation of Costs to Profit**

J-1. **Materials Acquisition and Recording Procedure**

J-2. **General Procurement Procedure**

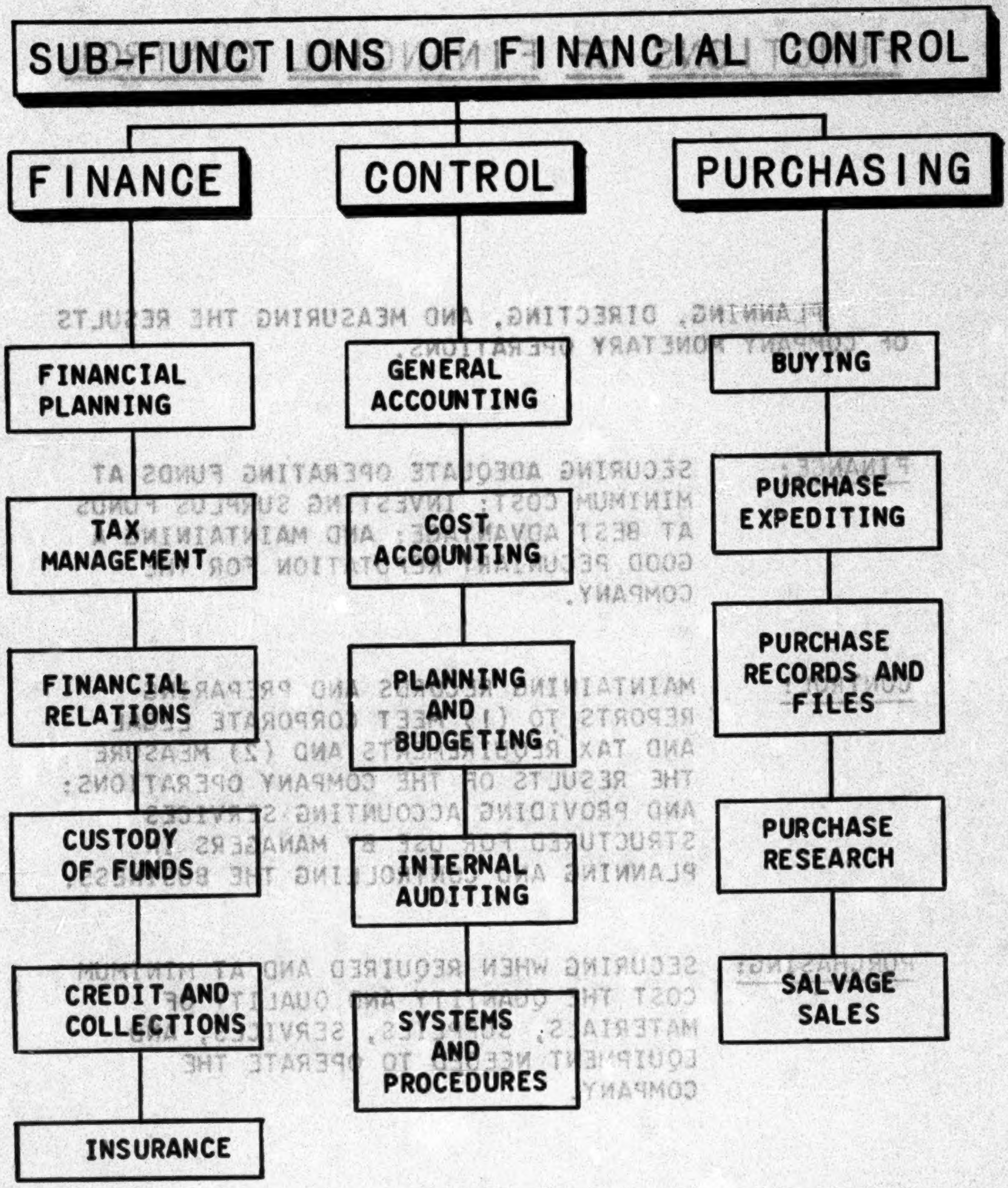
A

FUNCTIONS OF FINANCIAL CONTROL

PLANNING, DIRECTING, AND MEASURING THE RESULTS OF COMPANY MONETARY OPERATIONS.

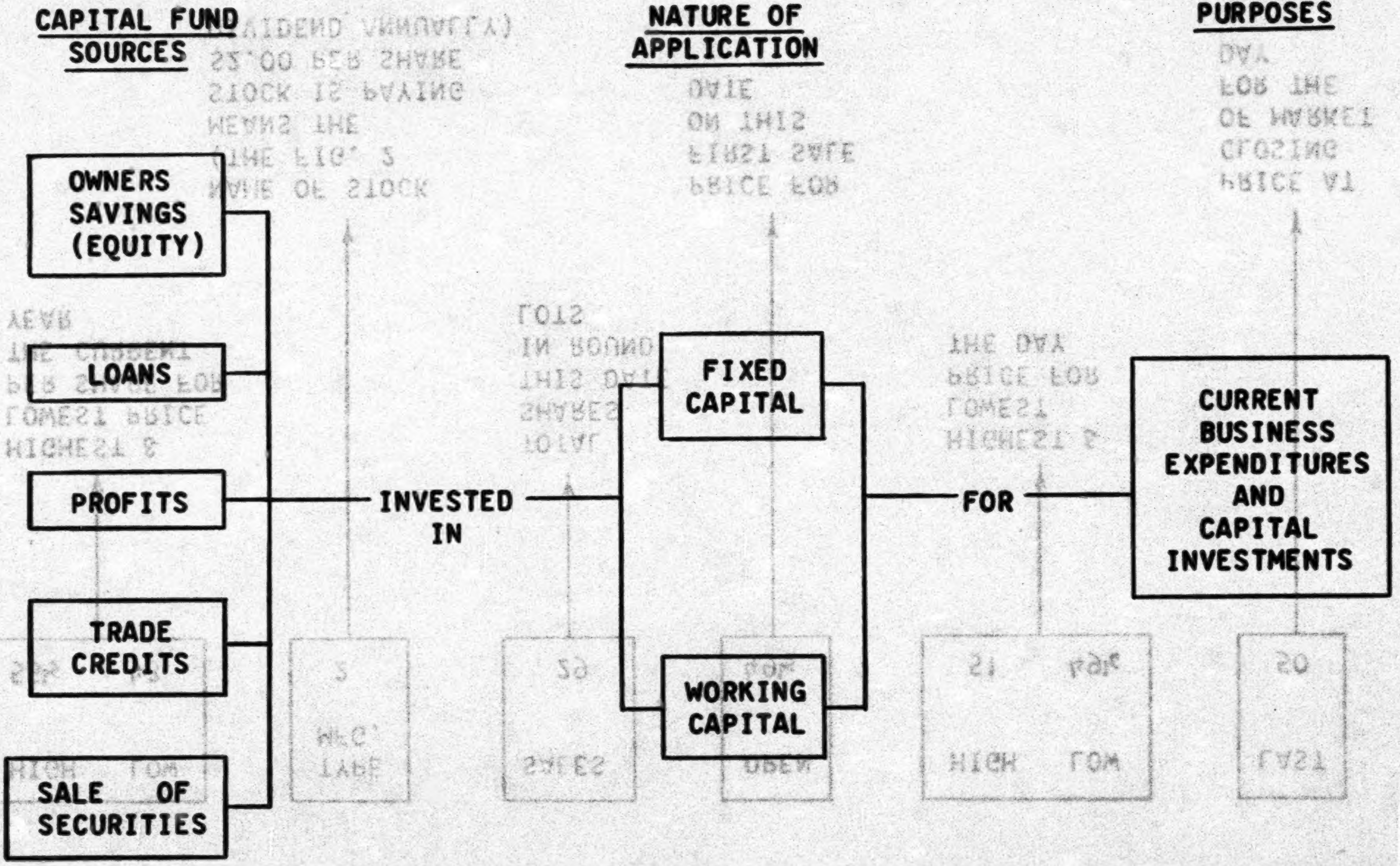
FINANCE:	SECURING ADEQUATE OPERATING FUNDS AT MINIMUM COST; INVESTING SURPLUS FUNDS AT BEST ADVANTAGE; AND MAINTAINING A GOOD PECUNIARY REPUTATION FOR THE COMPANY.
CONTROL:	MAINTAINING RECORDS AND PREPARING REPORTS TO (1) MEET CORPORATE LEGAL AND TAX REQUIREMENTS AND (2) MEASURE THE RESULTS OF THE COMPANY OPERATIONS; AND PROVIDING ACCOUNTING SERVICES STRUCTURED FOR USE BY MANAGERS IN PLANNING AND CONTROLLING THE BUSINESS.
PURCHASING:	SECURING WHEN REQUIRED AND AT MINIMUM COST THE QUANTITY AND QUALITY OF MATERIALS, SUPPLIES, SERVICES, AND EQUIPMENT NEEDED TO OPERATE THE COMPANY.

ACME, COMMON BODY OF KNOWLEDGE, CHART V.


SUB-FUNCTIONS OF FINANCIAL CONTROL
FINANCE
CONTROL
PURCHASING
FINANCIAL PLANNING
TAX MANAGEMENT
FINANCIAL RELATIONS
CUSTODY OF FUNDS
CREDIT AND COLLECTIONS
INSURANCE
GENERAL ACCOUNTING
COST ACCOUNTING
PLANNING AND BUDGETING
INTERNAL AUDITING
SYSTEMS AND PROCEDURES
BUYING
PURCHASE EXPEDITING
PURCHASE RECORDS AND FILES
PURCHASE RESEARCH
SALVAGE SALES

ACME, COMMON *BODY OF KNOWLEDGE*, CHART V.

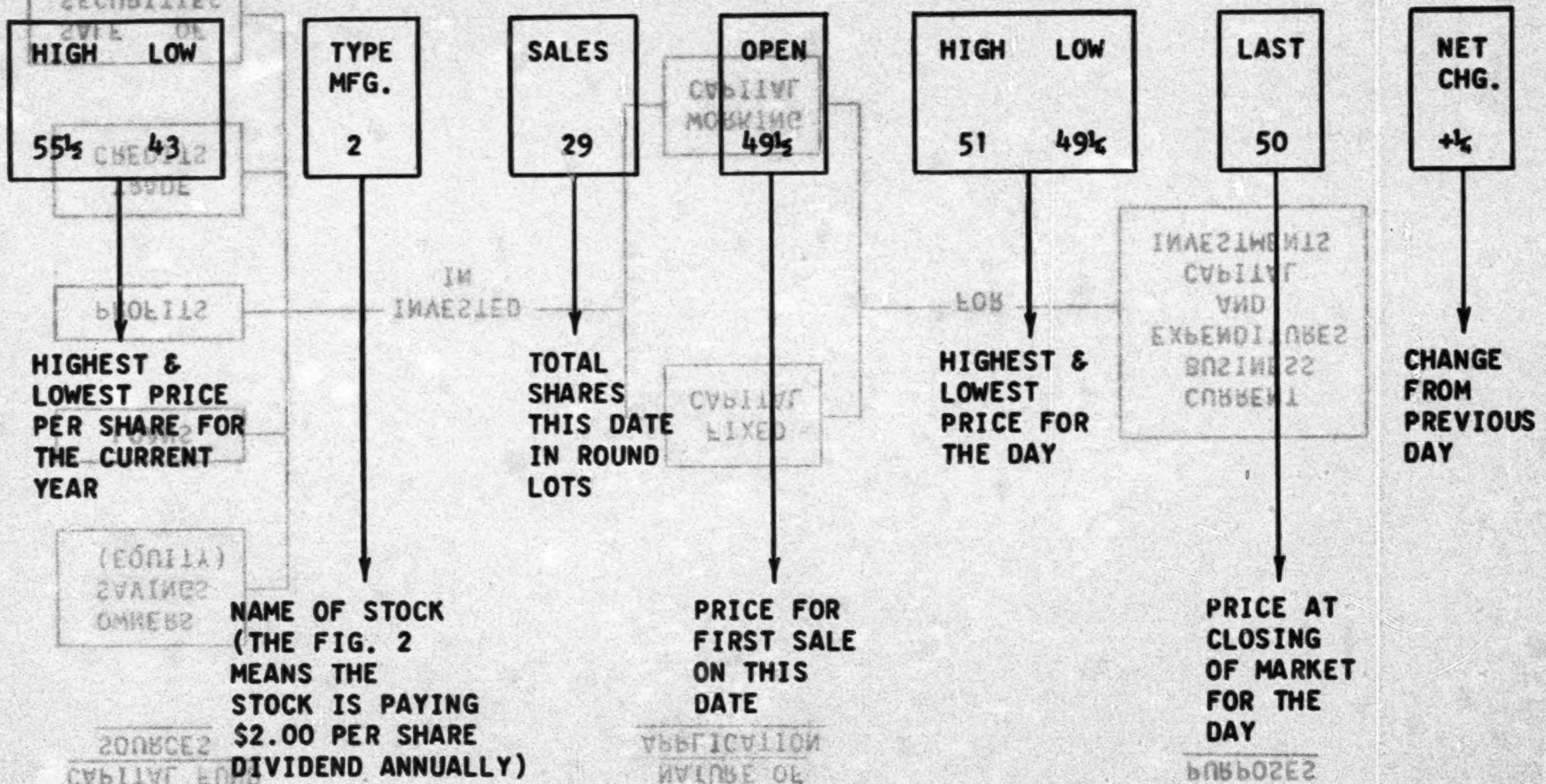
THE SOURCES OF CAPITAL FINANCING


CAPITAL FUND SOURCES
NATURE OF APPLICATION
PURPOSES
OWNERS SAVINGS (EQUITY)
LOANS
PROFITS
TRADE CREDITS
SALE OF SECURITIES
INVESTED IN
FIXED CAPITAL
WORKING CAPITAL
FOR
CURRENT BUSINESS EXPENDITURES AND CAPITAL INVESTMENTS

WHEELER, BUSINESS: AN INTRODUCTORY ANALYSIS, P. 383.

C

HOW TO READ THE FINANCIAL PAGE OF YOUR NEWSPAPER


HIGH LOW
55½ 43
TYPE MFG.
2
SALES
29
OPEN
49½
HIGH LOW
51 49¼
LAST
50
NET CHG.
+¼

HIGHEST & LOWEST PRICE PER SHARE FOR THE CURRENT YEAR

NAME OF STOCK (THE FIG. 2 MEANS THE STOCK IS PAYING $2.00 PER SHARE DIVIDEND ANNUALLY)

TOTAL SHARES THIS DATE IN ROUND LOTS

PRICE FOR FIRST SALE ON THIS DATE

HIGHEST & LOWEST PRICE FOR THE DAY

PRICE AT CLOSING OF MARKET FOR THE DAY

CHANGE FROM PREVIOUS DAY

D

MUSSELMAN & HUGHES, INTRODUCTION TO MODERN BUSINESS, P. 333.

E-1

CONSOLIDATED BALANCE SHEET

Assets

	December 31, 1963	December 31, 1962
Current Assets		
Cash	$ 51,233,573	$ 50,661,049
Marketable securities—at cost and accrued interest (approximate market)	37,630,522	30,034,328
Accounts and notes receivable—trade, less allowances for possible losses (1963 and 1962—$2,433,019)	78,172,391	76,085,121
Inventories—Note A	243,382,687	237,388,401
TOTAL CURRENT ASSETS	$ 410,419,173	$ 394,168,899
Investments and Other Assets		
Investments in and receivables from unconsolidated subsidiaries—Note B	$ 14,931,809	$ 14,359,802
Investments in and receivables from associated companies—Note C	44,802,915	41,466,200
Miscellaneous investments and receivables	11,663,164	11,550,347
	$ 71,397,888	$ 67,376,349
Properties		
Steel producing, manufacturing, raw material and transportation facilities—at cost	$1,415,665,410	$1,364,264,928
Less allowances for depreciation, depletion, and amortization	769,226,214	719,544,068
	$ 646,439,196	$ 644,720,860
Deferred		
Prepaid royalties and other deferred charges	22,401,319	21,610,058
	$1,150,657,576	$1,127,876,166

REPUBLIC STEEL, ANNUAL REPORT, 1963.

E-2

UBLIC STEEL CORPORATION AND CONSOLIDATED SUBSIDIARIES • DECEMBER 31, 1963 AND DECEMBER 31, 1962

Liabilities and Stockholders' Equity

	December 31, 1963	December 31, 1962
Current Liabilities		
Accounts payable and accrued liabilities	$ 96,938,598	$ 97,001,967
Federal taxes on income, less U. S. Government securities (1963—$14,237,250; 1962—$3,714,323)	12,459,949	7,635,708
Taxes—other than federal taxes on income	24,593,881	23,459,887
Current portion of long-term debt	16,372,712	16,332,730
TOTAL CURRENT LIABILITIES	$ 150,365,140	$ 144,430,292
Long-Term Debt		
Total amount outstanding, less current portion—Note D	180,816,230	200,243,554
Other Liabilities and Reserves		
Deferred federal taxes and non-current liability—Note E	$ 43,548,961	$ 31,802,667
Operating and other reserves	11,921,441	11,425,636
	$ 55,470,402	$ 43,228,303
Stockholders' Equity		
Capital stock:		
Prior preference—par value $100 per share; authorized 467,698 shares; none issued		
Common—par value $10 per share; authorized 28,000,000 shares; issued 15,779,084 shares (1962—15,778,014 shares) including shares in treasury—Note F .	$ 157,790,840	$ 157,780,140
Capital surplus	144,868,023	144,849,975
Income retained and invested in the business—Note D	461,542,220	437,539,181
	$ 764,201,083	$ 740,169,296
Less Common Stock in treasury (1963 and 1962—29,990 shares)—at cost	195,279	195,279
	$ 764,005,804	$ 739,974,017
	$1,150,657,576	$1,127,876,166

REPUBLIC STEEL, ANNUAL REPORT, 1963.

F

Republic Steel Corporation and Consolidated Subsidiaries

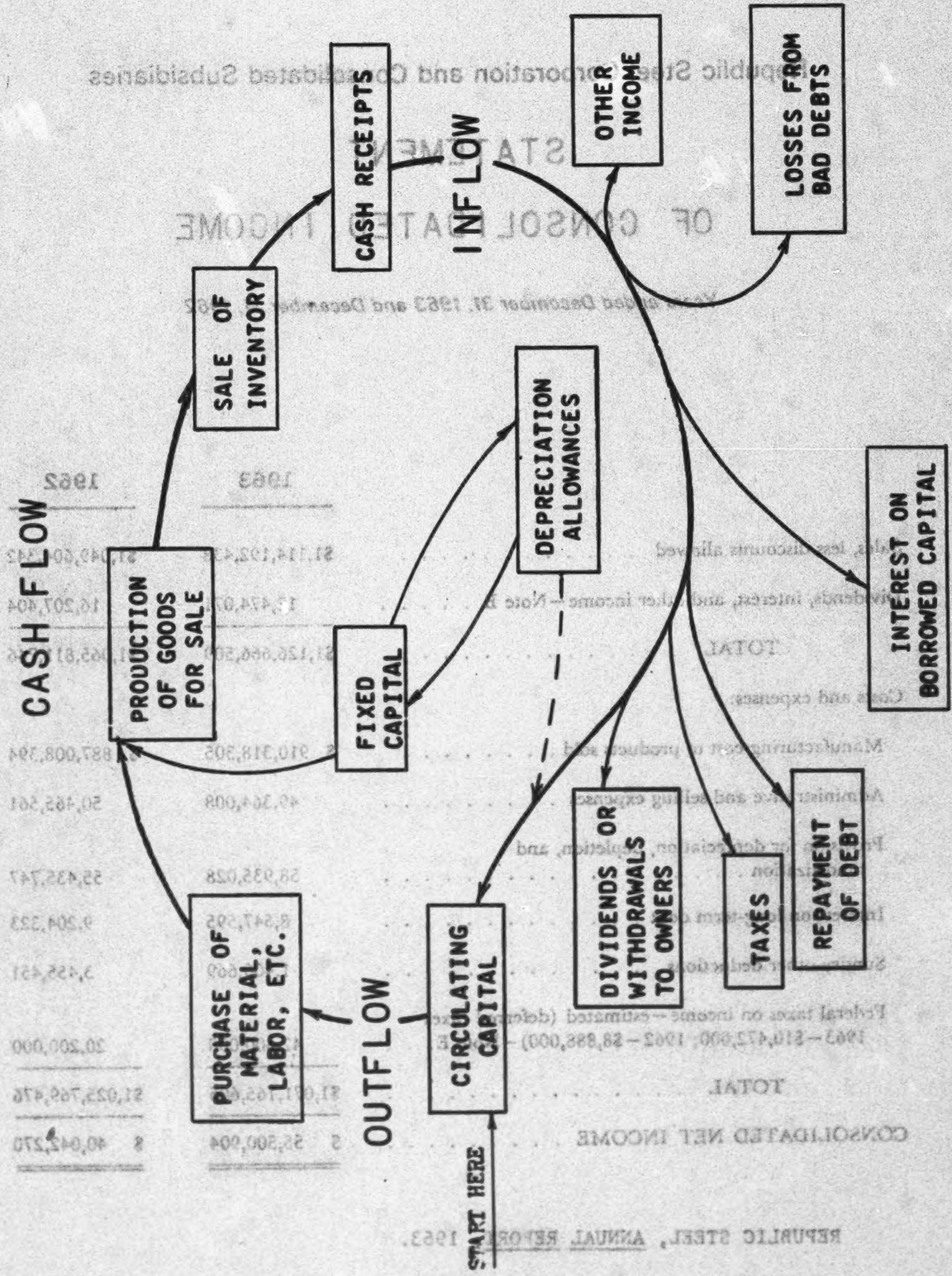
STATEMENT OF CONSOLIDATED INCOME

Years ended December 31, 1963 and December 31, 1962

	1963	1962
Sales, less discounts allowed	$1,114,192,438	$1,049,604,342
Dividends, interest, and other income—Note B	12,474,071	16,207,404
TOTAL	$1,126,666,509	$1,065,811,746
Costs and expenses:		
Manufacturing cost of products sold	$ 910,318,305	$ 887,008,394
Administrative and selling expenses	49,364,008	50,465,561
Provision for depreciation, depletion, and amortization	58,935,028	55,435,747
Interest on long-term debt	8,547,595	9,204,323
Sundry other deductions	1,400,669	3,455,451
Federal taxes on income—estimated (deferred taxes 1963—$10,472,000; 1962—$8,888,000)—Note E.	42,600,000	20,200,000
TOTAL	$1,071,165,605	$1,025,769,476
CONSOLIDATED NET INCOME	$ 55,500,904	$ 40,042,270

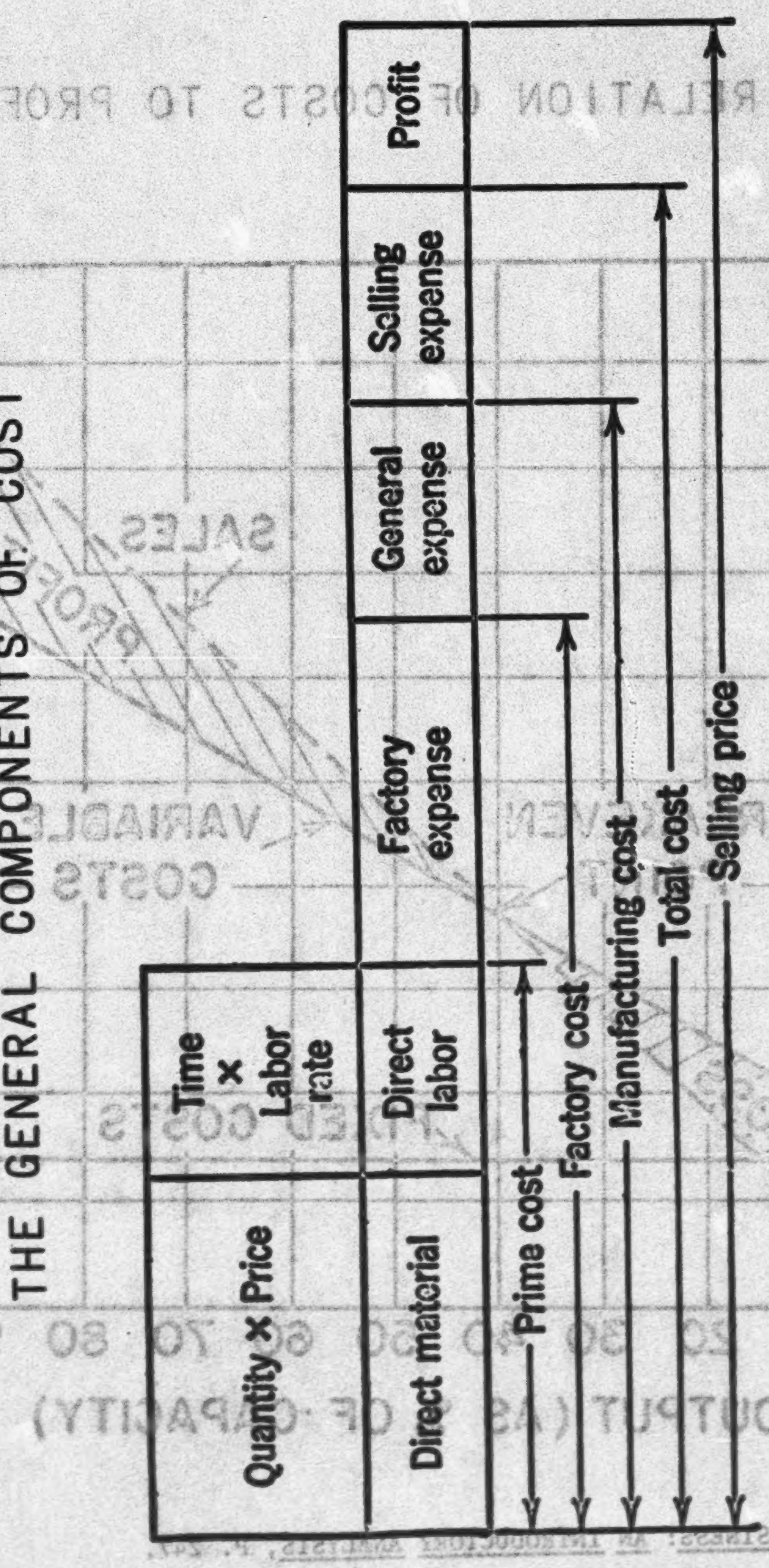
REPUBLIC STEEL, ANNUAL REPORT, 1963.

G


CASH FLOW
PRODUCTION OF GOODS FOR SALE
SALE OF INVENTORY
CASH RECEIPTS
INFLOW
OTHER INCOME
LOSSES FROM BAD DEBTS
DEPRECIATION ALLOWANCES
FIXED CAPITAL
INTEREST ON BORROWED CAPITAL
REPAYMENT OF DEBT
TAXES
DIVIDENDS OR WITHDRAWALS TO OWNERS
CIRCULATING CAPITAL
OUTFLOW
PURCHASE OF MATERIAL, LABOR, ETC.
START HERE

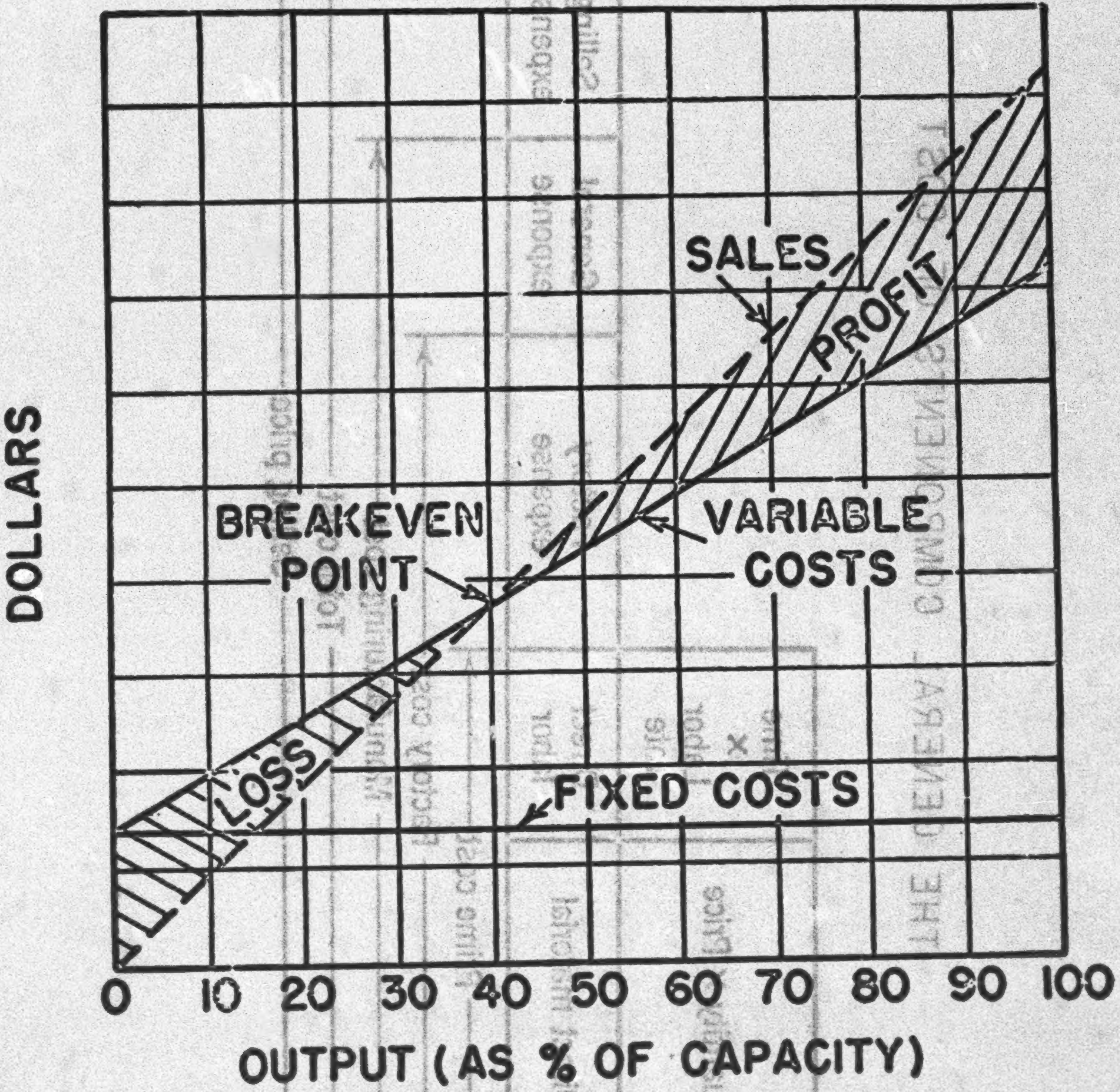
WHEELER, BUSINESS: AN INTRODUCTORY ANALYSIS, P. 376.

H


THE GENERAL COMPONENTS OF COST
Quantity × Price
Time × Labor rate
Direct material
Direct labor
Factory expense
General expense
Selling expense
Profit
Prime cost
Factory cost
Manufacturing cost
Total cost
Selling price

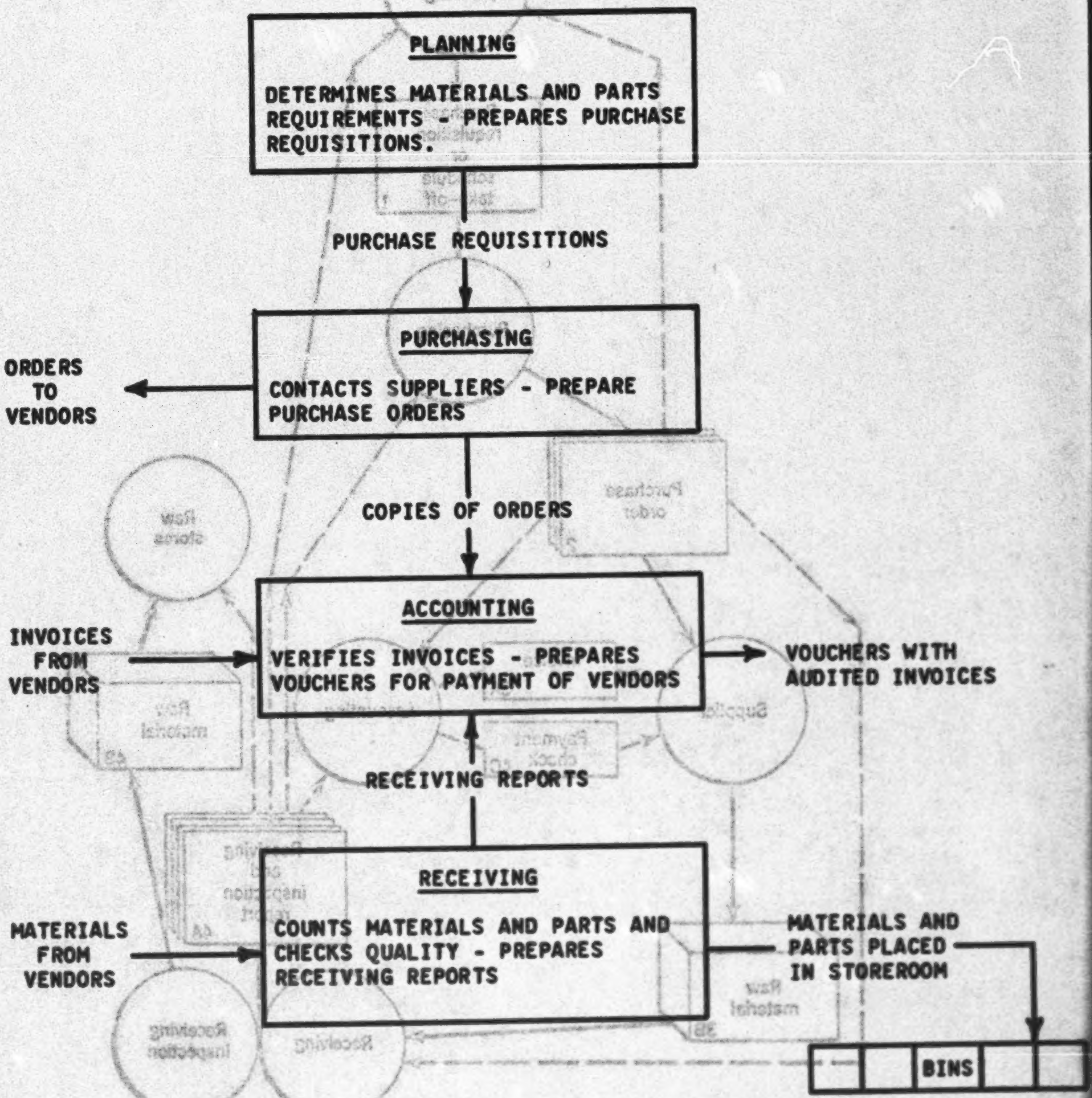
STRONG, THE MANAGEMENT OF BUSINESS, P. 143.

RELATION OF COSTS TO PROFIT



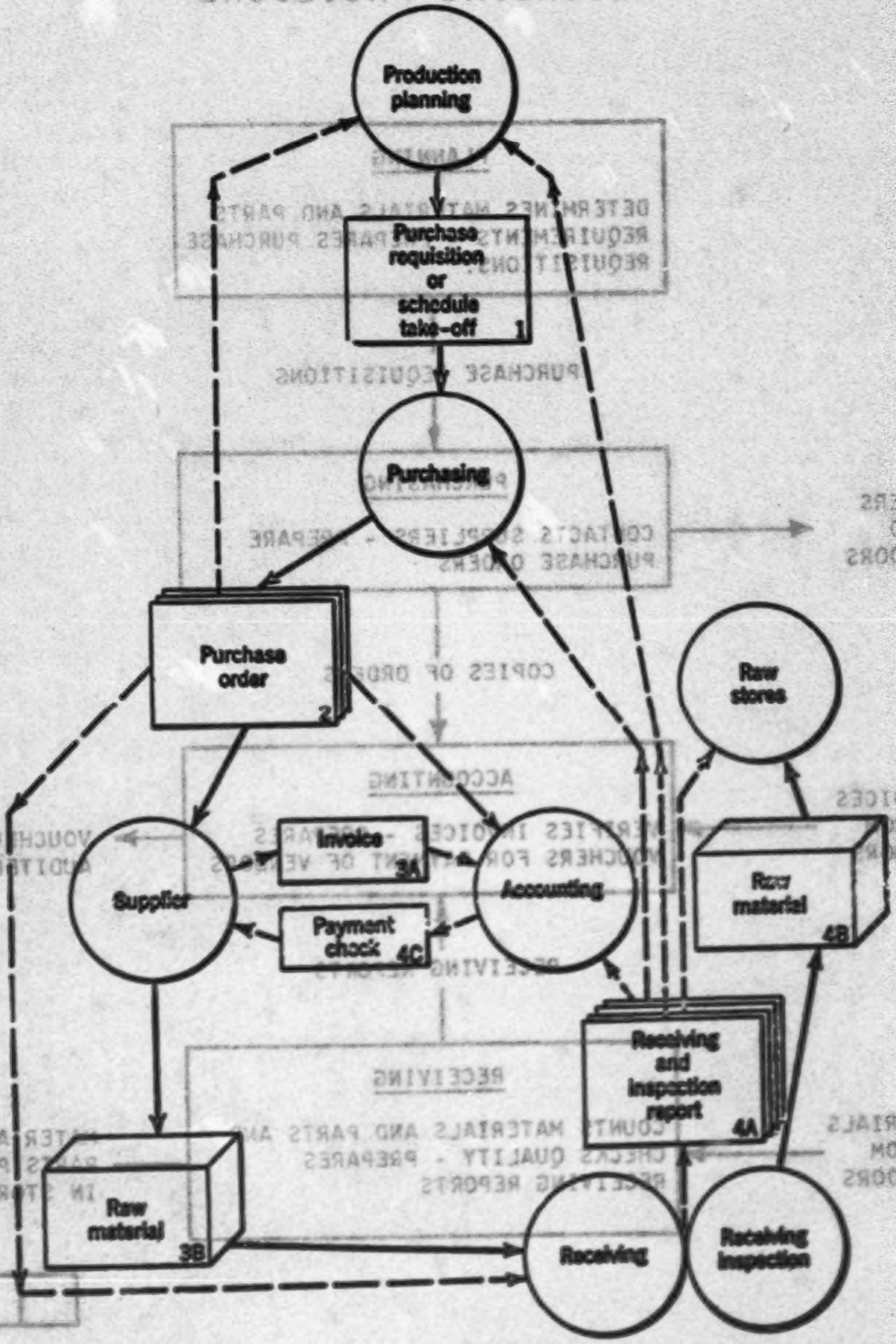
WHEELER, BUSINESS: AN INTRODUCTORY ANALYSIS, P. 247.

MATERIAL ACQUISITION and RECORDING PROCEDURE


PLANNING
DETERMINES MATERIALS AND PARTS REQUIREMENTS - PREPARES PURCHASE REQUISITIONS.
PURCHASE REQUISITIONS
PURCHASING
CONTACTS SUPPLIERS - PREPARE PURCHASE ORDERS
ORDERS TO VENDORS
COPIES OF ORDERS
ACCOUNTING
INVOICES FROM VENDORS
VERIFIES INVOICES - PREPARES VOUCHERS FOR PAYMENT OF VENDORS
VOUCHERS WITH AUDITED INVOICES
RECEIVING REPORTS
RECEIVING
MATERIALS FROM VENDORS
COUNTS MATERIALS AND PARTS AND CHECKS QUALITY - PREPARES RECEIVING REPORTS
MATERIALS AND PARTS PLACED IN STOREROOM
BINS

Brummet, R. Lee. Cost Accounting for Small Manufacturers. Washington, Small Business Administration, 1953.

GENERAL PROCUREMENT PROCEDURE


Production planning
Purchase requisition or schedule take-off
1
Purchasing
Purchase order
2
Raw stores
Supplier
Invoice
3A
Accounting
Payment check
4C
Raw material
4B
Receiving and inspection report
4A
Raw material
3B
Receiving
Receiving inspection

MACNIECE, PRODUCTION, FORECASTING PLANNING, AND CONTROL, P. 183.

MARKETING

(Seminar Unit - 17)

I. Introduction

Exposing the future industrial arts teacher to contemporary marketing practices is a prime objective of this program. Such exposure will better enable the teacher to interpret those important functions and concepts to public school students including: market research, distribution, packaging, advertising, and customer and product service.

II. Contemporary Marketing

A. Directing and encouraging the flow of goods from producer to consumer or user
   1. Keystone of success (Quote #1)
      a. Provide market for product
      b. Indicate new products and markets
      c. Transports goods to user
      d. Other

   2. Expensive
      a. Geographic and industrial specialization
      b. Increases in packaging and services
      c. Inability to automate extensively

B. Types of goods marketed (Quote #2)
   1. Consumer
      a. Convenience goods
      b. Shopping goods
      c. Speciality goods

   2. Industrial
      a. Raw materials
      b. Semi-manufactured goods
      c. Parts
      d. Supplies
      e. Machinery and equipment

III. Organization

A. Functions (A) (7:235-252)
   1. Marketing research
   2. Advertising
   3. Sales promotion
   4. Sales planning
   5. Sales operations
   6. Physical distribution

B. Sub-functions (B)
   1. Market research (4:241-263)
      a. Market analysis
      b. Product requirements determination
      c. Distribution problem analysis

2. Advertising (4:219-230)
    a. Campaign planning
    b. Copy preparation
    c. Media selection
    d. Production

3. Sales Promotion (4:230-235)
    a. Program development
    b. Sales aids

4. Sales planning (7:247)
    a. Sales policies determination
    b. Budgeting
    c. Pricing
    d. Buying
    e. Packaging

5. Sales operations (6:481-489)
    a. Salesmen procurement
    b. Salesmen training
    c. Salesmen direction
    d. Salesmen compensation
    e. Order service
    f. Selling

6. Physical Distribution (6:435-441)
    a. Warehousing
    b. Shipping
    c. Product service

C. Inter-relationships of functions (C) (5:31)
  1. Marketing Research is used to assist in establishing General Management Objectives which determines Product Planning and Marketing Planning. From the market plan Programs are developed and integrated so that field action may be initiated by distributors and dealers to influence customers to buy the product.

IV. Purposes & Functions of Marketing Activities

A. Marketing research (7:235-252)
  1. Definition (Quote #3)
  2. Areas of market research
      a. Product or services
      b. Markets
      c. Sales
      d. Advertising and sales promotion
      e. Marketing administration

  3. Uses of market research
      a. Developing new products
      b. Analyzing markets
      c. Estimating sales potential
      d. Developing sales methods
      e. Determining customer preference

f. Determining competitive position
g. Improving present products and services
h. Discovering new uses for products

4. Techniques of market research (3:202)
   a. Market survey of
      (1) Product
      (2) Market
      (3) Competition
      (4) Distribution

   b. Economic study (2:176)
      (1) Studies economic data
      (2) Predicts effect of economic trends on market

   c. Motivational research (4:243)
      (1) Supports economic research
      (2) Deals with psychological motivating factors in the market place

B. Advertising
   1. Non-personal presentation or promotion of ideas, goods, or services by an identified sponsor

   2. Functions of advertising (6:501)
      a. Retain customers
      b. Reduce loss of customers
      c. Recruit new customers

   3. Categories of advertising (1:553)
      a. Promotion of products
      b. Promotion of image

   4. Appeals of advertising copy (Quote #4)
      a. Hunger
      b. Love
      c. Vanity
      d. Fear

   5. Ingredients of good advertising (D)
      a. Right product supported by the correct message directed at the correct market

   6. Types of advertising
      a. National
      b. Regional
      c. Local
      d. Retail
      e. Trade
      f. Industrial
      g. Professional
      h. Institutional

7. **Advertising media**
    - a. Magazines
    - b. Newspapers
    - c. Outdoor displays
    - d. Car signs
    - e. Store signs
    - f. Directories and catalogs
    - g. Radio
    - h. Television
    - i. Motion pictures
    - j. Menues and programs
    - k. Novelties

8. **Use of media (E)**
    - a. Newspapers 30.5%
    - b. Direct 15.9%
    - c. Television 13.9%
    - d. Magazine 12.7%
    - e. Radio 5.9%
    - f. Outdoor 1.5%
    - g. Miscellaneous 19.6%

9. **News releases (Example #1)**
    - a. Introduces new products
    - b. Free

C. **Sales promotion**

1. Non-personal selling supplementing personal selling and advertising

2. Moves product toward consumer

3. Types of promotions (8:183)
    - a. Sampling
    - b. Premiums
    - c. Contests
    - d. Special events
    - e. Displays
    - f. Brands and trademarks

4. Coordinating advertising and sales promotion (Example #2)

D. **Sales planning**

1. Budgets
    - a. Estimating costs

2. Pricing
    - a. Factors effecting price (F)
        - (1) Competition
        - (2) Demand
        - (3) Substitute products
        - (4) Attitudes of buyers
        - (5) Laws

3. **Packaging**
    - a. Purposes
        - (1) Protects quality
        - (2) Keep clean
        - (3) Assures honest weight
        - (4) Provides for brand identification
    - b. Functions (consumer products)
        - (1) Displayability
        - (2) Stackability
    - c. Functions (industrial products)
        - (1) Transport
        - (2) Protect

E. **Sales operations**
1. Functions of salesman (5:8)
    - a. Contact
    - b. Arouse interest
    - c. Create preference
    - d. Make proposal
    - e. Close order
    - f. Keep customer sold
2. Salesman training (Example #3)

F. **Distribution**
1. Moving product from plant to consumer
2. Channels
    - a. Consumer goods (G)
        - (1) Direct
        - (2) Company salesman (door-to-door)
        - (3) Wholesaler
        - (4) Retailer
        - (5) Wholesaler - retailer
        - (6) Agent - wholesaler - retailer
        - (7) Manufacturer's branch - retailer
    - b. Industrial goods (H)
        - (1) Direct
        - (2) Manufacturers sales branch (actually same as #1)
        - (3) Industrial distributor
        - (4) Agent or broker

V. **Summary**

A. Customer through market research and company through product planning contribute to establish marketing objectives.

B. The Basic market plan is established and contains supporting plans which comprise the final market plan.

C. The final marketing plan, through field sales, distributor plans, and dealer plans hopes to persuade the customer to buy the product.

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7. Shubin, John A., *Business Management*. New York, New York, Barnes & Noble, 1965.

8. Strong, Earl P., *The Management of Business*. New York, New York, Harper and Row, 1965.

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MARKETING

EXAMPLES

1. News Release for New Product.

   To include the following data:
   a. description of the new product
   b. who the company is
   c. what department will manufacture it
   d. what the market is
   e. picture of new product
   f. picture of engineering team, president of company, etc.
   g. approximate selling price if appropriate

2. Schedule of Advertising and Sales Promotion.

   For either a new product or existing product to include a time table for all media.

3. Salesman Training Program Outline.

   To include all orientations, seminars, films, guest speakers, and evaluation.

MARKETING

QUOTATIONS

Quote #1

As increasing geographic and industrial specialization makes markets wider and more complex, business profits increasingly hinge on the existance of mass consumer demand and practical marketing.

Shubin, Business Management, p. 235.

Quote #2

Consumer Goods: goods that consumers buy from retail outlets for their personal satisfaction.

1. **Convenience goods:** those goods which consumers buy at retail outlets near their homes. Usually staple items of low unit value, purchased frequently and in small quantities. Consumers are not usually interested in comparing prices or comparing quality when they purchase such goods.

2. **Shopping goods:** that group of consumer goods in which price, fashion, quality, and service are of considerable importance. Shopping goods are relatively high in value and are bought infrequently and only after deliberation. The purchaser is willing to take time to visit a number of stores which are usually located within a few blocks of each other in busy shopping areas.

3. **Specialty goods:** goods that possess some distinctive quality for which the consumer has a strong preference. They are usually, but not always, items of high unit value, such as automobiles, televisions, etc. This class of goods differs from shopping goods in that price is not the principle consideration.

Industrial Goods: industrial goods include all the various kinds of goods that are used or consumed by a business, and those that are used in the production of other goods.

(Approximately 45% of all manufactured goods are sold for industrial use and 80% of all farm products are sold on the industrial market)

1. **Raw materials:** primary or basic items that come from farms, mines, wells and forests. (grain, wool, petroleum, wood, etc.)

2. **Semi-manufactured goods:** goods that have been processed but will be sold to another manufacturer for further processing. Examples are pig iron, industrial chemicals, sheet aluminum.

3. **Parts:** manufactured items that will serve as components of larger articles, such as tubes for radios, bearings for machinery.

4. **Supplies:** not physically incorporated into the manufacturer's finished product, they are essential to the operation of his business. Examples -- wrapping paper, machine oil, cleaning compounds, and fuel.

5. **Machinery and equipment:** all machines--large and small--used in production and office work.

Musselman and Hughes, Introduction to Modern Business, pp. 418-420.

Quote #3

Market Research is the diligent and thorough search to find significant facts and relationships pertaining to any subject or problem in the field of marketing.

Major Marketing Research Areas:

1. Products or services
2. Markets
3. Sales
4. Advertising and sales promotion
5. Marketing administration

Jucius and Terry, Introduction to Business, p. 241.

Quote #4

Appeals of advertising copy:

Appeal to hunger:	indicates needs of individuals for food, shelter, and clothing based on the awareness of physical discomfort when these requisites are unavailable.
Appeal to love:	emotional reaction based on the relationship between the sexes.
Appeal to vanity:	appeals emphasizing the desire to possess relatively large numbers of material things.
Appeal to fear:	based on the fear of the unpredictable - usually utilized in a subtle manner.

Heidingsfield and Blankenship, Marketing, p. 151.

MARKETING

INDEX TO TRANSPARENCIES

A. Marketing Functions

B. Marketing Sub-Functions

C. Marketing Inter-Relationships

D. Ingredients for Effective Advertising

E. Advertising Budgets 1961

F. Factors Effecting the Price of a Product

G. Marketing Channels - Consumer Goods

H. Marketing Channels - Industrial Goods

A

MARKETING FUNCTIONS

DEFINITION: DIRECTING AND ENCOURAGING THE FLOW OF GOODS FROM PRODUCER TO CONSUMER OR USER.

MARKETING RESEARCH: GATHERING, RECORDING, AND ANALYZING FACTS RELATING TO THE TRANSFER AND SALE OF PRODUCTS.

ADVERTISING: THE NON-PERSONAL PRESENTATION AND PROMOTION OF IDEAS, PRODUCTS, OR SERVICES PAID FOR BY A SPONSOR.

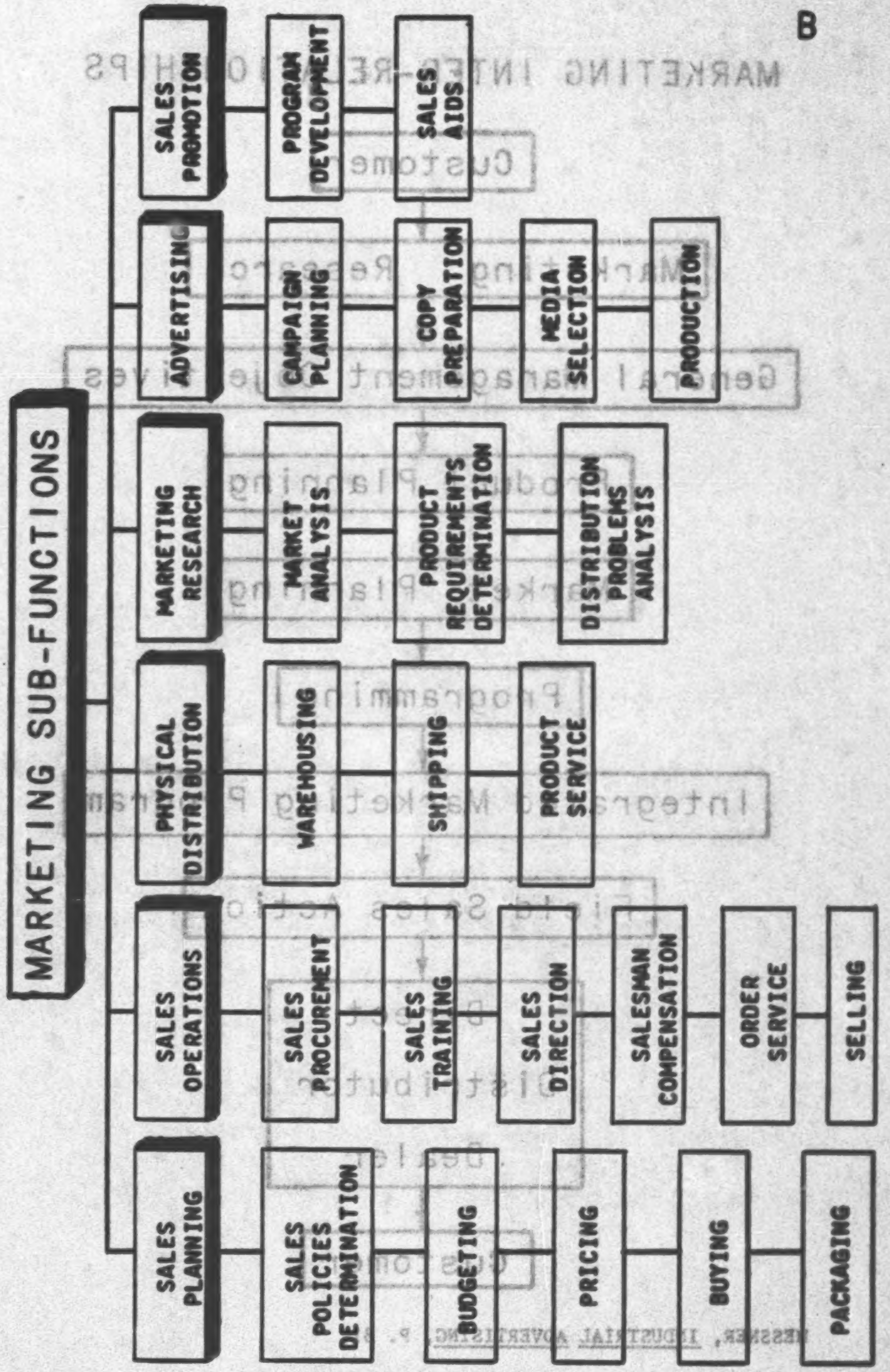
SALES PROMOTION: SUPPLEMENTING AND CO-ORDINATING PERSONAL SELLING AND ADVERTISING FOR GREATER EFFECTIVENESS.

SALES PLANNING: PLANNING FOR MARKETING THE RIGHT PRODUCTS AT THE RIGHT PLACE, AT THE RIGHT TIME, IN THE RIGHT QUANTITIES, AND AT THE RIGHT PRICE.

SALES OPERATIONS: TRANSFERRING PRODUCTS TO CUSTOMERS IN EXCHANGE FOR MONEY.

PHYSICAL DISTRIBUTION: MOVING AND HANDLING PRODUCTS FROM THE POINT OF STORAGE TO THE POINT OF CONSUMPTION OR USE.

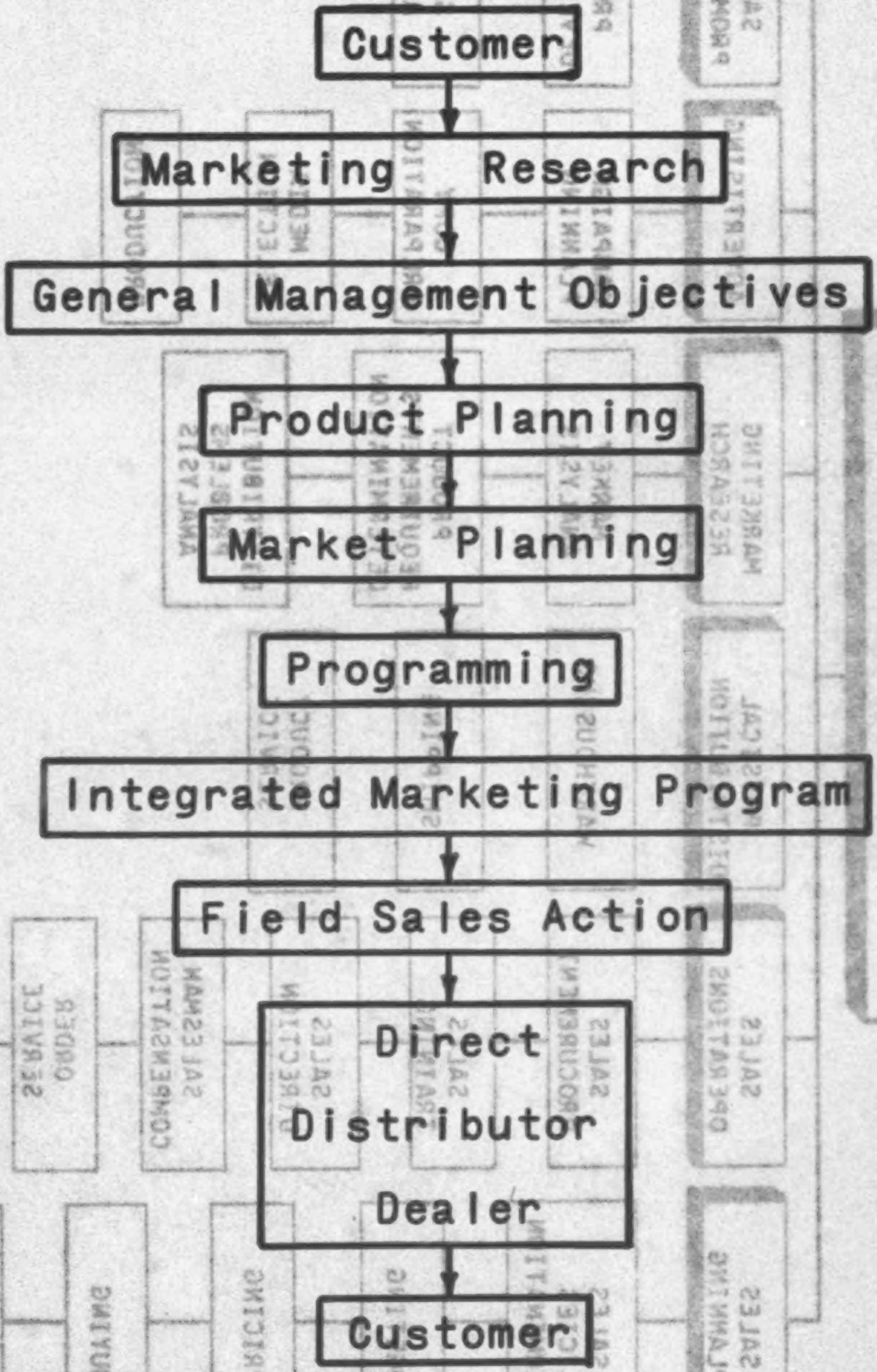
BETHEL, AND OTHERS, *INDUSTRIAL ORGANIZATION AND MANAGEMENT*, P. 534.


B
MARKETING SUB-FUNCTIONS
SALES PLANNING
SALES POLICIES DETERMINATION
BUDGETING
PRICING
BUYING
PACKAGING
SALES OPERATIONS
SALES PROCUREMENT
SALES TRAINING
SALES DIRECTION
SALESMAN COMPENSATION
ORDER SERVICE
SELLING
PHYSICAL DISTRIBUTION
WAREHOUSING
SHIPPING
PRODUCT SERVICE
MARKETING RESEARCH
MARKET ANALYSIS
PRODUCT REQUIREMENTS DETERMINATION
DISTRIBUTION PROBLEMS ANALYSIS
ADVERTISING
CAMPAIGN PLANNING
COPY PREPARATION
MEDIA SELECTION
PRODUCTION
SALES PROMOTION
PROGRAM DEVELOPMENT
SALES AIDS

ACME, *COMMON BODY OF KNOWLEDGE*, CHART IV.

C

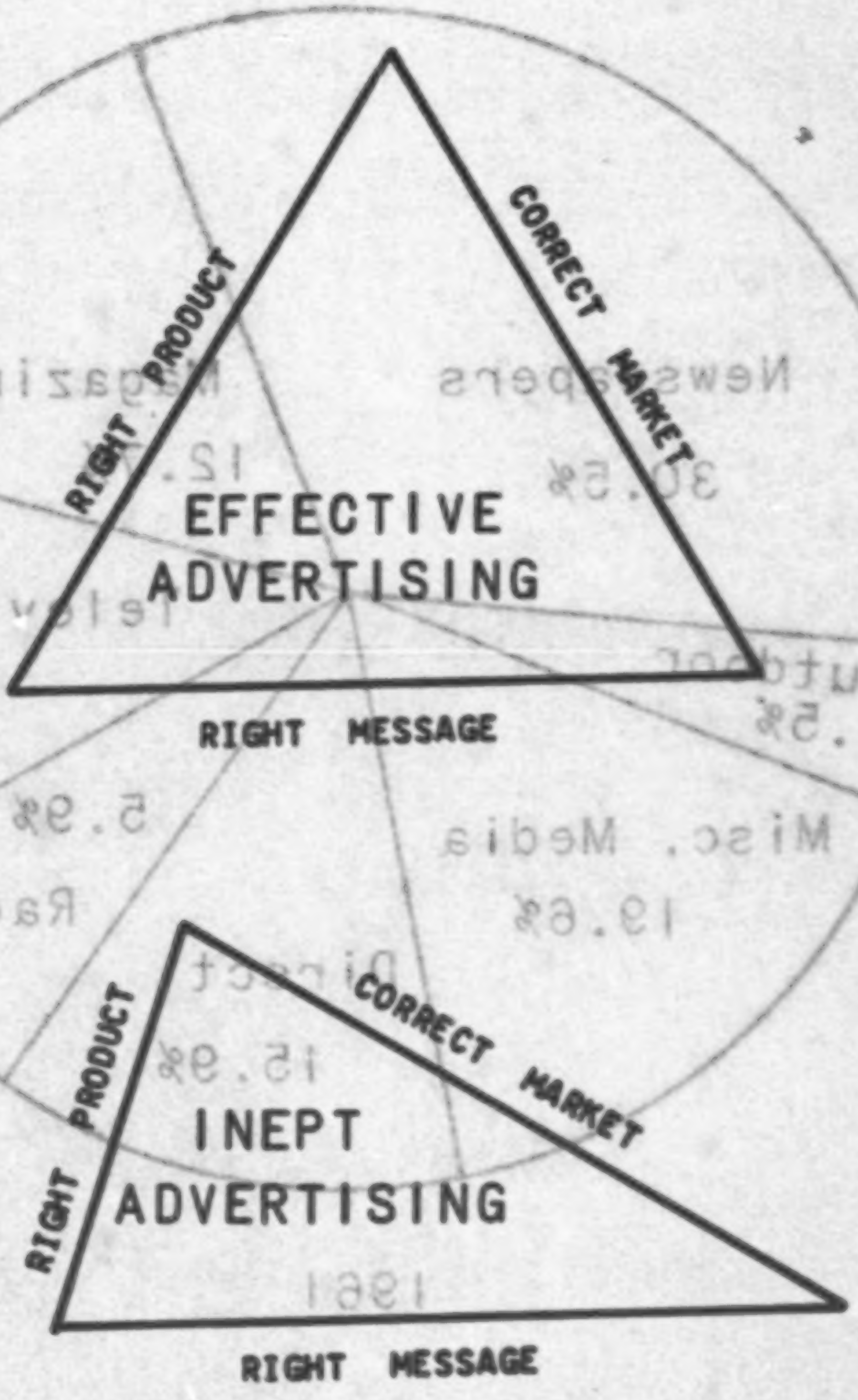
MARKETING INTER-RELATIONSHIPS


Customer
Marketing Research
General Management Objectives
Product Planning
Market Planning
Programming
Integrated Marketing Program
Field Sales Action
Direct
Distributor
Dealer
Customer

MESSNER, INDUSTRIAL ADVERTISING, P. 31.

D

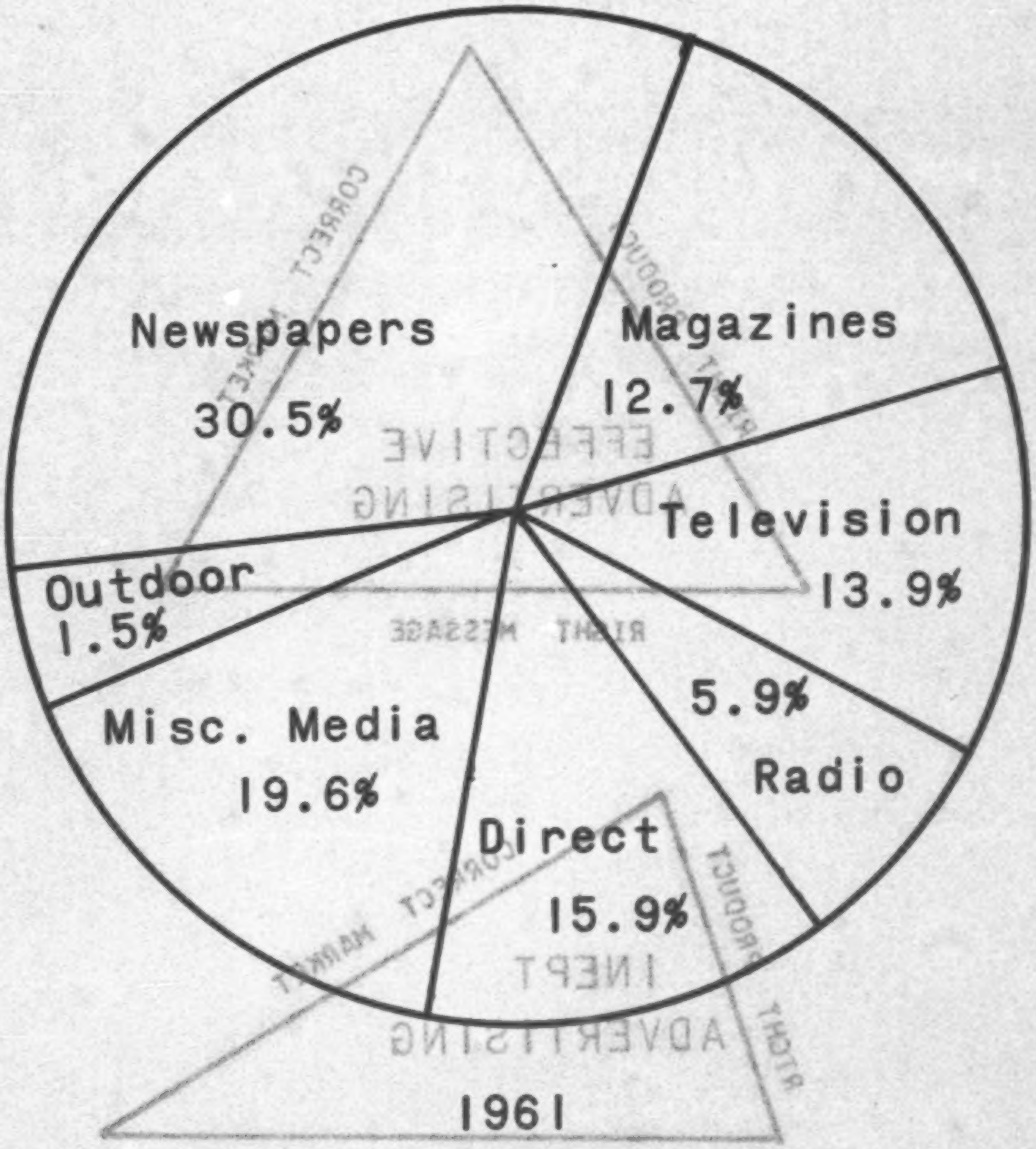
INGREDIENTS FOR EFFECTIVE ADVERTISING


RIGHT PRODUCT
CORRECT MARKET
EFFECTIVE ADVERTISING
RIGHT MESSAGE
RIGHT PRODUCT
CORRECT MARKET
INEPT ADVERTISING
RIGHT MESSAGE

JUCIUS & TERRY, INTRODUCTION TO BUSINESS, P. 220.

E

ADVERTISING BUDGETS-1961

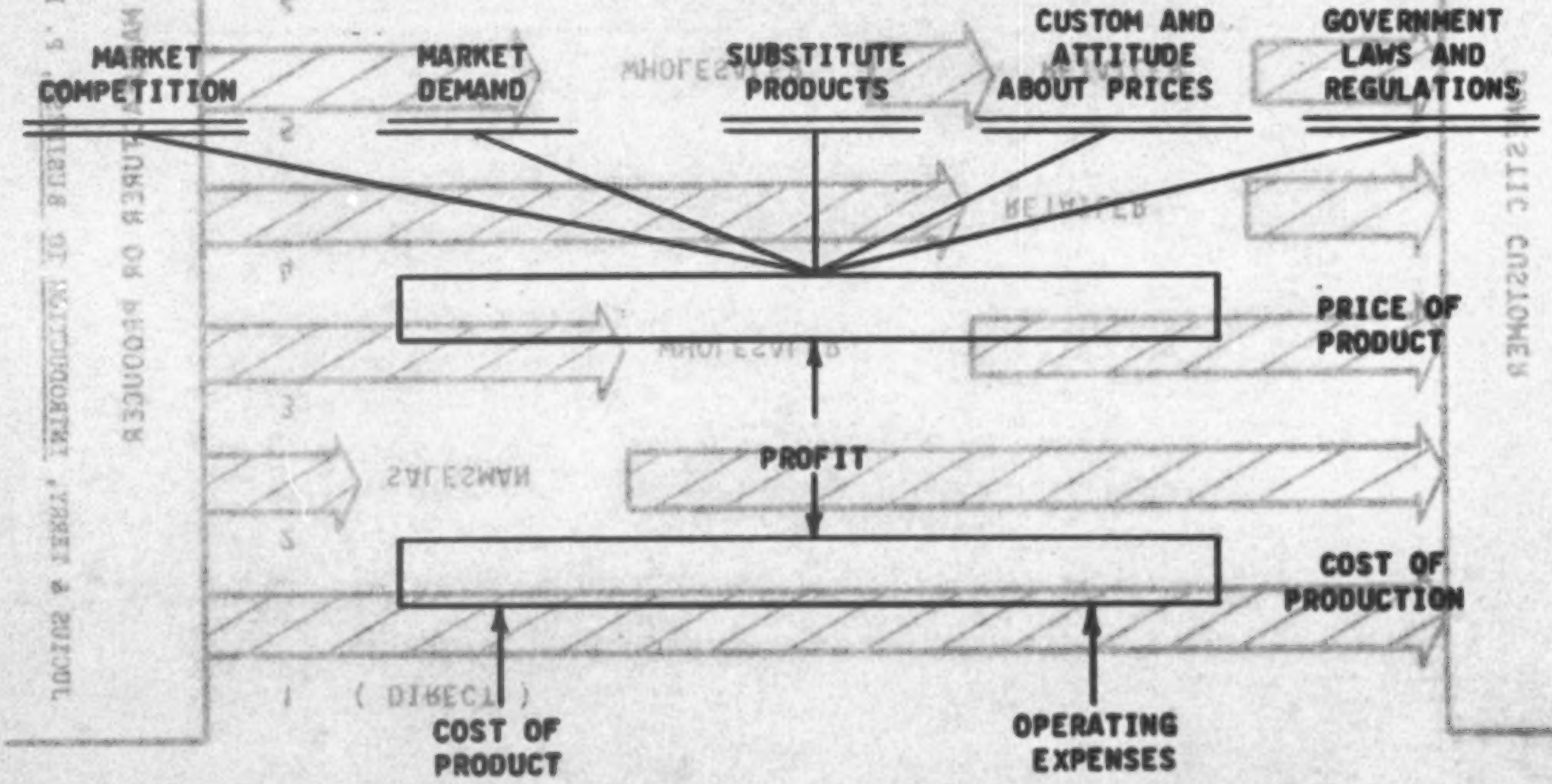


1961

MUSSELMAN AND HUGHES, INTRODUCTION TO MODERN BUSINESS, P. 506.

C-278

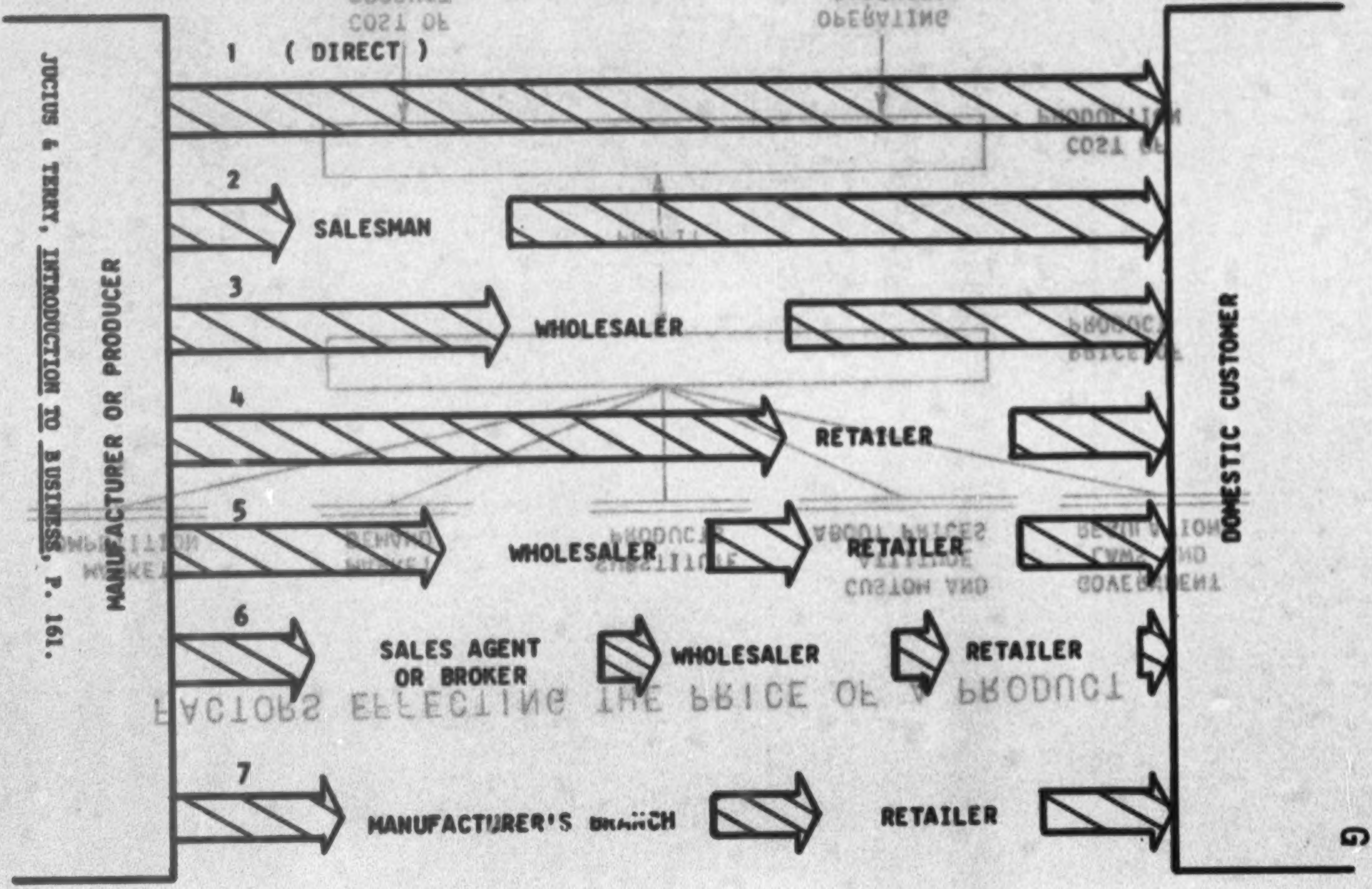
FACTORS EFFECTING THE PRICE OF A PRODUCT


MARKET COMPETITION
MARKET DEMAND
SUBSTITUTE PRODUCTS
CUSTOM AND ATTITUDE ABOUT PRICES
GOVERNMENT LAWS AND REGULATIONS
PRICE OF PRODUCT
PROFIT
COST OF PRODUCTION
COST OF PRODUCT
OPERATING EXPENSES

F

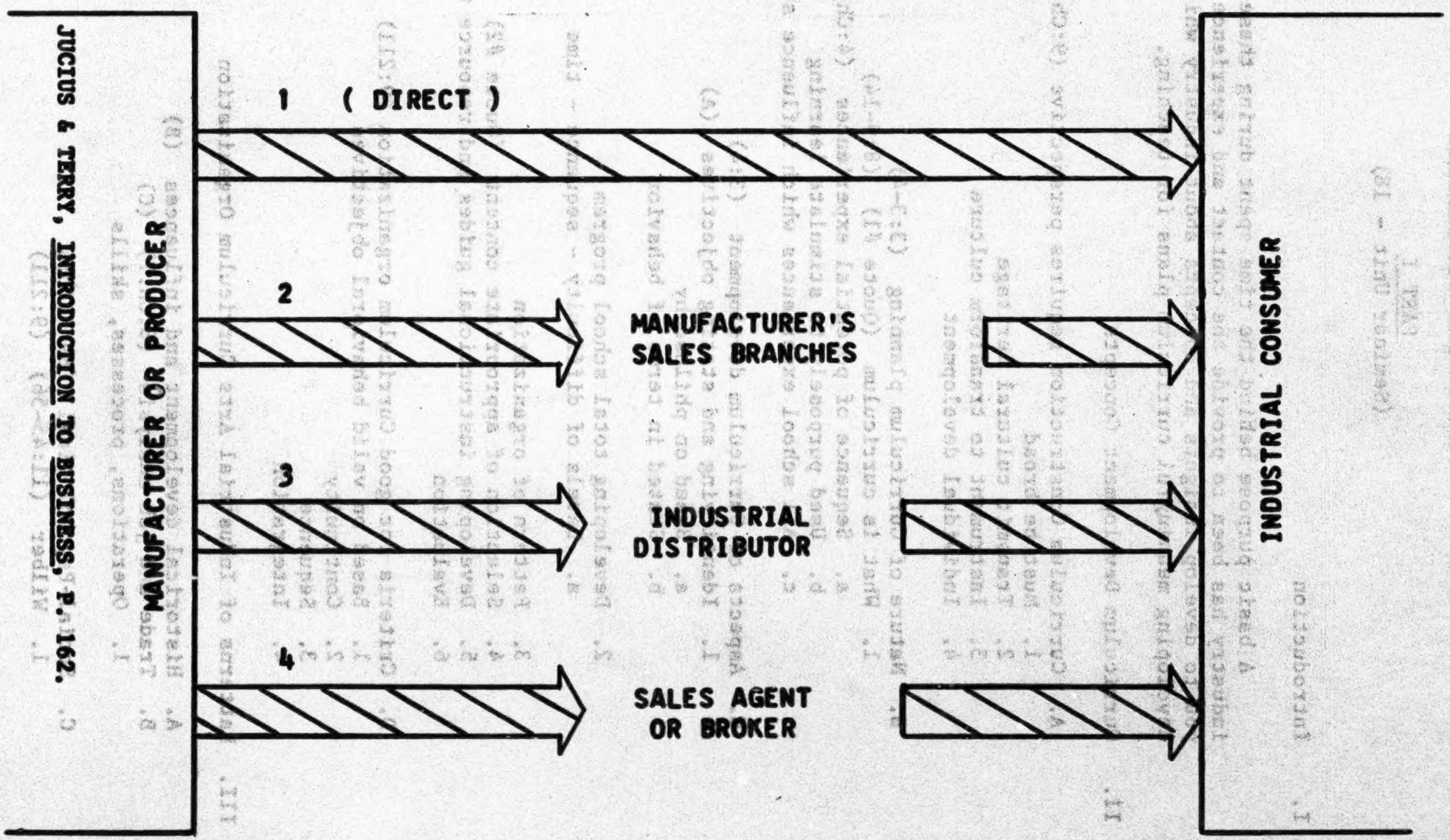
WHEELER, BUSINESS: AN INTRODUCTORY ANALYSIS, P. 328.

MARKETING CHANNELS - CONSUMER GOODS


MANUFACTURER OR PRODUCER
1 (DIRECT)
2
SALESMAN
3
WHOLESALER
4
RETAILER
5
WHOLESALER
RETAILER
6
SALES AGENT OR BROKER
WHOLESALER
RETAILER
7
MANUFACTURER'S BRANCH
RETAILER
DOMESTIC CUSTOMER
G

JUCIUS & TERRY, INTRODUCTION TO BUSINESS, P. 161.

MARKETING CHANNELS - INDUSTRIAL GOODS


MANUFACTURER OR PRODUCER
1 (DIRECT)
2
MANUFACTURER'S SALES BRANCHES
3
INDUSTRIAL DISTRIBUTOR
4
SALES AGENT OR BROKER
INDUSTRIAL CONSUMER

JUCIUS & TERRY, INTRODUCTION TO BUSINESS, P. 162.

CURRICULUM CONSTRUCTION

PART I

(Seminar Unit - 18)

I. Introduction

A basic purpose behind the time spent during these previous weeks in industry has been to provide the contact and experience which will enable you to develop insights and concepts about industry which may be used in developing meaningful curriculum plans for teaching.

II. Curriculum Development Concepts

A. Curriculum Construction requires perspective (9:Ch.2) (7:Ch.1)
  1. Must be broad
  2. Transmit cultural heritage
  3. Instrument to transform culture
  4. Individual development

B. Nature of Curriculum planning (3:3-4)
  1. What is curriculum (Quote #1) (8:9-14)
    a. Sequence of potential experiences (4:Ch.1)
    b. Used purposely to stimulate learning
    c. All school experiences which influence student

C. Aspects of Curriculum development (3:4)
  1. Identifying and stating objectives (A)
    a. Based on philosophy
    b. Stated in terms of behavior

  2. Developing total school program
    a. Levels of difficulty - sequence - time

  3. Pattern of organization
  4. Selection of appropriate content (Quote #2)
  5. Developing instructional guides and resource units
  6. Evaluation

D. Criteria for good Curriculum organization (9:211) (10:48-54)
  1. Based on valid behavioral objectives
  2. Continuity
  3. Sequence
  4. Integration

III. Patterns of Industrial Arts Curriculum Organization

A. Historical development and influences (B)

B. Trade and job analysis (6:Ch.7) (C)
  1. Operations, processes, skills

C. Social-Psychological (Behavior)
  1. Wilber (11:45-56) (9:211)

D. Study of industry
    1. Stout State Study
    2. Common functions or elements

E. Study of technology (Quote #3)
    1. Olson (4:Ch.XIII) (D)
    2. DeVore (2:1-2) (E)
    3. State of Maine (F)
    4. Public school pattern (G)
    5. Survey 1920 - 1970 (H)

IV. Elements of Curriculum Development

A. Curriculum Guides (3:203) (6:19)
B. Course of study
C. Instructional units (Quote #4)
D. Resource units (Quote #5) (3:233)
E. Lesson Plans (1:9)

V. Course of Study (10:48-54) (8:69-70) (6:192-193)

A. Means of organizing efficient instruction (Quote #6)
    1. Major concepts to be understood

B. Particular subject for particular grade level and length of time (7:186-189)
C. Sequentially organized
D. Instructional units
    1. Technical manipulative
    2. Related informational

E. Learning activities suggested
F. Teaching resources
G. References

Bibliography

1. Bakamis, William, *Improving Instruction in Industrial Arts*, Milwaukee, Wisconsin, Bruce Publishing Co., 1966.

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3. Krug, Edward A., *Curriculum Planning*. New York, Harper and Row, 1957.

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9. Taba, Hilda, *Foundation for Curriculum Development*. New York, Harcourt, Brace and World, 1962.

10. Thornton, James; Wright, John; *Secondary School Curriculum*. Columbus, Ohio, Charles Merrill, 1963.

11. Wilber, Gordon O., *Industrial Arts in General Education*. Scranton International Textbook, 1948.

12. Woodruff, Asahel, "The Use of Concepts in Teaching and Learning", *Journal of Teacher Education*. March 1964.

Quote #1

defines curriculum as "A sequence of potential experiences is set up in the school for the purpose of disciplining children and youth in group ways of thinking and acting. This set of experiences is referred to as curriculum."

Smith, Fundamentals of Curriculum Development, p. 3.

* * *

"Whatever content is used purposely by the school as a stimulus to learning."

Buswell, The Psychology of Learning, NSSE Yearbook 41, part II

Quote #2

Commenting on basis for content selection:

It is equally apparent that items of information concerning American industrial society cannot be assimilated or remembered unless they are organized into some kind of an integrated pattern. There is a need for a central core or theme around which all such information can be related.....

There are probably several ways in which such an organization might be made. One method, which gives considerable promise of success, is to group all related topics around a "study of industry".

Wilber, Industrial Arts in General Education, p. 94.

——— ——— ——— ——— ——— ———

More recently a selection of content based on broader more universal areas has been proposed by DeVore.

To accept the challenge and to take advantage of the opportunity industrial arts educators need only to address themselves to the study of the organized body of technological knowledge. A structure which in present terminology can be organized into major instructional and core areas such as: the construction industries, the transportation industries, the research and development industries, a study of the organization and management of work and the craft and service industries.

DeVore, Technology and Intellectual Discipline, p. 15.

——— ——— ——— ——— ——— ———

Further emphasis for this point of view is expressed by Taba:

Analyzing the impact of technology and the changes it has produced or is producing in society has been a favorite way, and up until recently practically the only way, of gaining social perspective in education. Underlying this approach to formulating a perspective has been the assumption that technology is the focus and the core of the American culture, the chief initiator and agency of social and cultural change.

Taba, Foundations for Curriculum Development, p. 34 - 35.

Quote #3

Technology is a primary resource because it serves primary needs. Technology in America feeds, clothes, houses, transports, informs, entertains us. It educates us, keeps us healthy and secure, gives us leisure and the means to enjoy it. In this abundance we have reached the world's highest level of living and at this height, we are probably the worlds most envied nation...... To understand our culture, we must understand technology because it is our culture. To understand what has made America great, we must search technology. To understand what will keep America great, we must again study technology.

Olson, Industrial Arts and Technology, p. 32.

Referring to the organization of content for the study of technology, DeVore states:

An organizational structure is easily identified, however. It is a structure having both durability and continuity and is easily determined by a review of man's major technical endeavors through the centuries of his technological development.

These might be summarized as follows:

Endeavor		Curriculum area
as a builder	-	construction
as a communicator	-	communications
as a producer	-	manufacturing
as a transporter	-	transportation
as an organizer and manager		
as a craftsman		

DeVore, Technology An Intellectual Discipline, p. 14.

Quote #4

A unit of instruction is:

1. A major subdivision of a course of study, a textbook or a subject field particularly a subdivision in the social studies, practical arts or science.

2. An organization of various activities, experiences, and types of learning around a central problem or purpose, developed cooperatively by a group of pupils under teacher leadership involving planning.

Good, Dictionary of Education, p. 587.

Quote #5

A resource unit then is simply a collection of suggested learning activities and materials organized around a given topic to be used as a basis for a teacher's advance planning.

Krug, Curriculum Planning, p. 233.

Quote #6

When complete instructional analysis for a subject or activity has been made and each of the operations and informational topics outlined, the total content for a subject or activity has been identified. Such an analysis then serves as an encyclopedia, or as the resource material, for the selection of content to be taught.

Silvius and Bohn, Organizing Course Materials, p. 192.

When subject matter is put in conceptual form much of it will have to be sequenced for efficient learning...... It is becoming increasingly clear, however, that sequencing is not essential in many kinds of content and, where this is the case, it is an unnecessary complication in curriculum development.

Concept learning is being recognized as the dominant element in education. This does not mean that motor learning (skill), should be overlooked, but the implications of existing data are that it should be made supplementary to conceptual learning.

Woodruff, "The Use of Concepts in Teaching and Learning", p. 95.

CURRICULUM CONSTRUCTION

PART I

INDEX TO TRANSPARENCIES

A. Objectives of Industrial Arts

B. Curriculum Development in Industrial Arts

C. Industrial Arts Curriculum State Plan

D. Proposed Industrial Arts Curriculum To Reflect Technology - Olson

E. Proposed Curriculum Structure To Reflect Technology - DeVore

F. State of Maine Curriculum

G. Public School Pattern

H. Survey

OBJECTIVES OF INDUSTRIAL ARTS

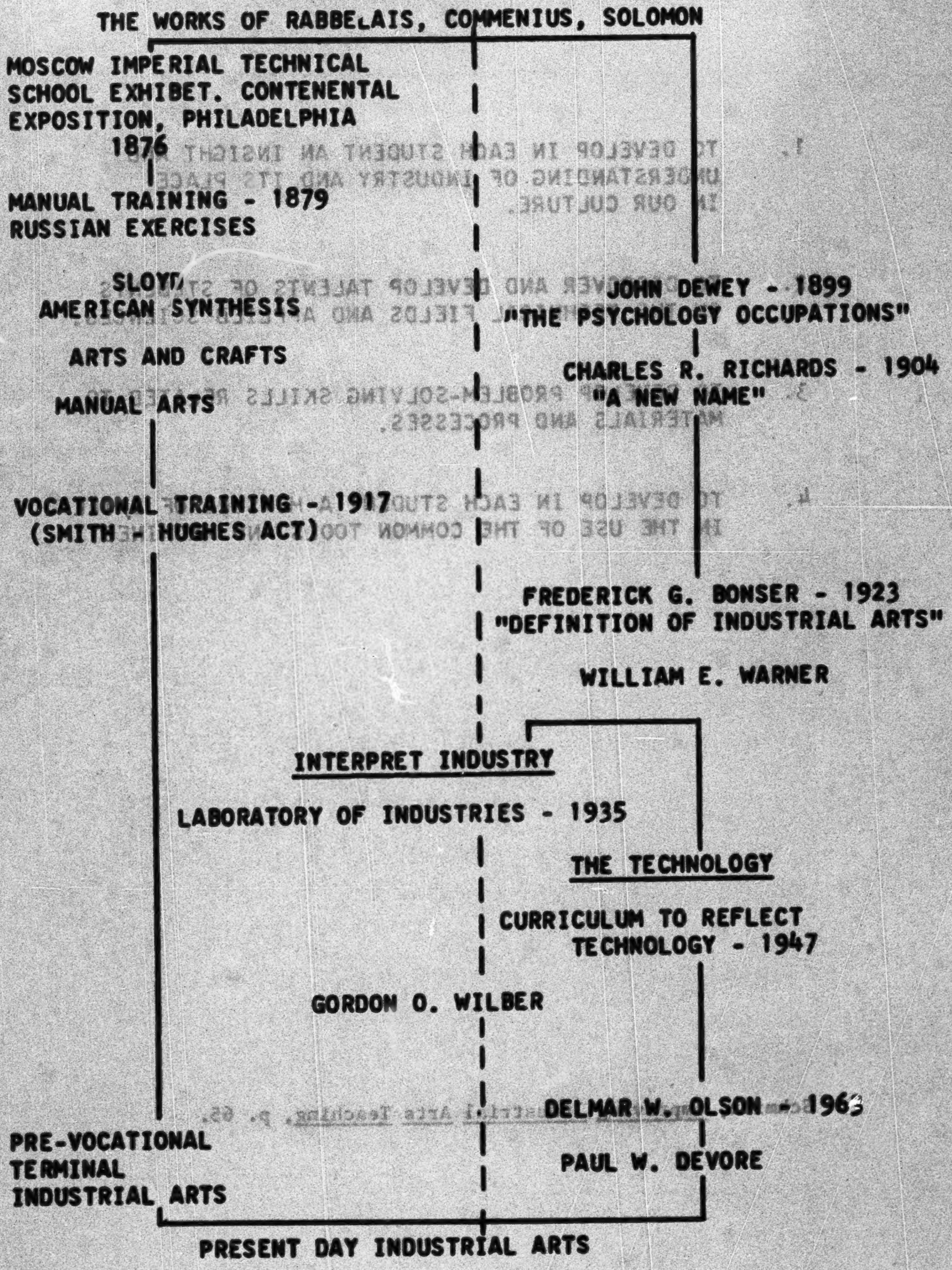
A

1. TO DEVELOP IN EACH STUDENT AN INSIGHT AND UNDERSTANDING OF INDUSTRY AND ITS PLACE IN OUR CULTURE.
2. TO DISCOVER AND DEVELOP TALENTS OF STUDENTS IN THE TECHNICAL FIELDS AND APPLIED SCIENCES.
3. TO DEVELOP PROBLEM-SOLVING SKILLS RELATED TO MATERIALS AND PROCESSES.
4. TO DEVELOP IN EACH STUDENT A MEASURE OF SKILL IN THE USE OF THE COMMON TOOLS AND MACHINES.

Schmitt, *Improving Industrial Arts Teaching*, p. 65.

CURRICULUM DEVELOPMENT IN INDUSTRIAL ARTS

B



THE WORKS OF RABBELAIS, COMMENIUS, SOLOMON

MOSCOW IMPERIAL TECHNICAL
SCHOOL EXHIBET. CONTENENTAL
EXPOSITION, PHILADELPHIA
1876

MANUAL TRAINING - 1879
RUSSIAN EXERCISES

SLOYD
AMERICAN SYNTHESIS

ARTS AND CRAFTS

MANUAL ARTS

JOHN DEWEY - 1899
"THE PSYCHOLOGY OCCUPATIONS"

CHARLES R. RICHARDS - 1904
"A NEW NAME"

VOCATIONAL TRAINING - 1917
(SMITH - HUGHES ACT)

FREDERICK G. BONSER - 1923
"DEFINITION OF INDUSTRIAL ARTS"

WILLIAM E. WARNER

INTERPRET INDUSTRY

LABORATORY OF INDUSTRIES - 1935

THE TECHNOLOGY

CURRICULUM TO REFLECT
TECHNOLOGY - 1947

GORDON O. WILBER

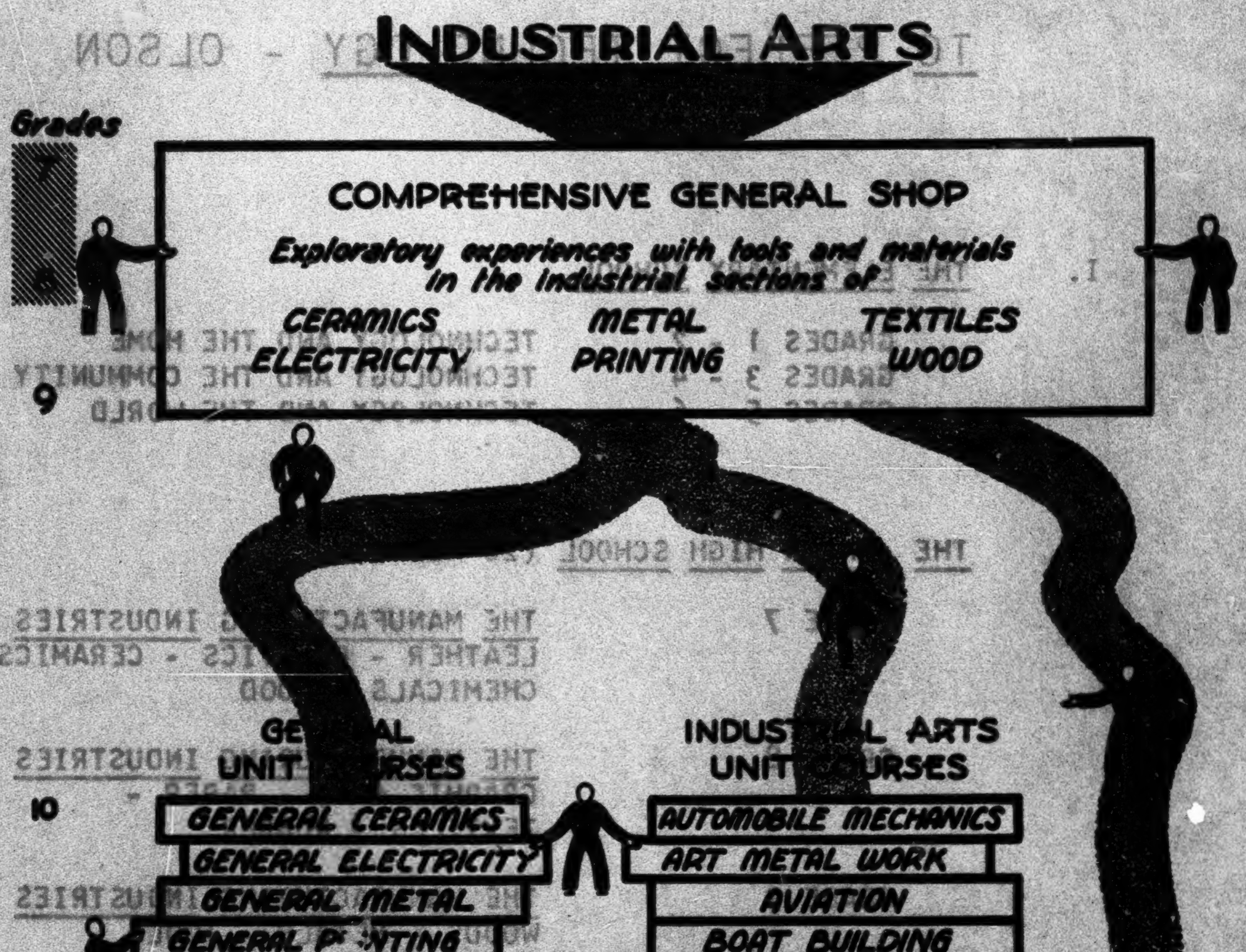
DELMAR W. OLSON - 1963

PAUL W. DEVORE

PRE-VOCATIONAL
TERMINAL
INDUSTRIAL ARTS

PRESENT DAY INDUSTRIAL ARTS

C


INDUSTRIAL ARTS
Grades
7
8
9
10
11
12
COMPREHENSIVE GENERAL SHOP
Exploratory experiences with tools and materials in the industrial sections of
CERAMICS
METAL
TEXTILES
ELECTRICITY
PRINTING
WOOD
GENERAL UNIT COURSES
GENERAL CERAMICS
GENERAL ELECTRICITY
GENERAL METAL
GENERAL PRINTING
GENERAL TEXTILES
GENERAL WOOD
INDUSTRIAL ARTS UNIT COURSES
AUTOMOBILE MECHANICS
ART METAL WORK
AVIATION
BOAT BUILDING
CERAMICS
ELECTRICITY
FURNITURE MAKING
HOME MECHANICS
JEWELRY MAKING
MACHINE SHOP
PHOTOGRAPHY
PRINTING
RADIO
RELATED MECH. DRAWING
TEXTILES
TRANSPORTATION
ONE ELECTIVE COURSE
Pupils may elect any two courses from either group to complete a sequence
▨ Required

SOURCE: NEW YORK EDUCATION DEPARTMENT, ADMINISTRATOR'S HANDBOOK OF SECONDARY SCHOOL CURRICULUM OF NEW YORK STATE, P. 60.

D

PROPOSED INDUSTRIAL ARTS CURRICULUM TO REFLECT TECHNOLOGY - OLSON

I. THE ELEMENTARY SCHOOL

GRADES 1 - 2	TECHNOLOGY AND THE HOME
GRADES 3 - 4	TECHNOLOGY AND THE COMMUNITY
GRADES 5 - 6	TECHNOLOGY AND THE WORLD

II. THE JUNIOR HIGH SCHOOL (20 WEEKS)

GRADE 7	THE MANUFACTURING INDUSTRIES LEATHER - PLASTICS - CERAMICS CHEMICALS - FOOD
GRADE 8	THE MANUFACTURING INDUSTRIES GRAPHIC ARTS - PAPER - TEXTILES - RUBBER
GRADE 9	THE MANUFACTURING INDUSTRIES WOODS - METALS - TOOLS - MACHINES

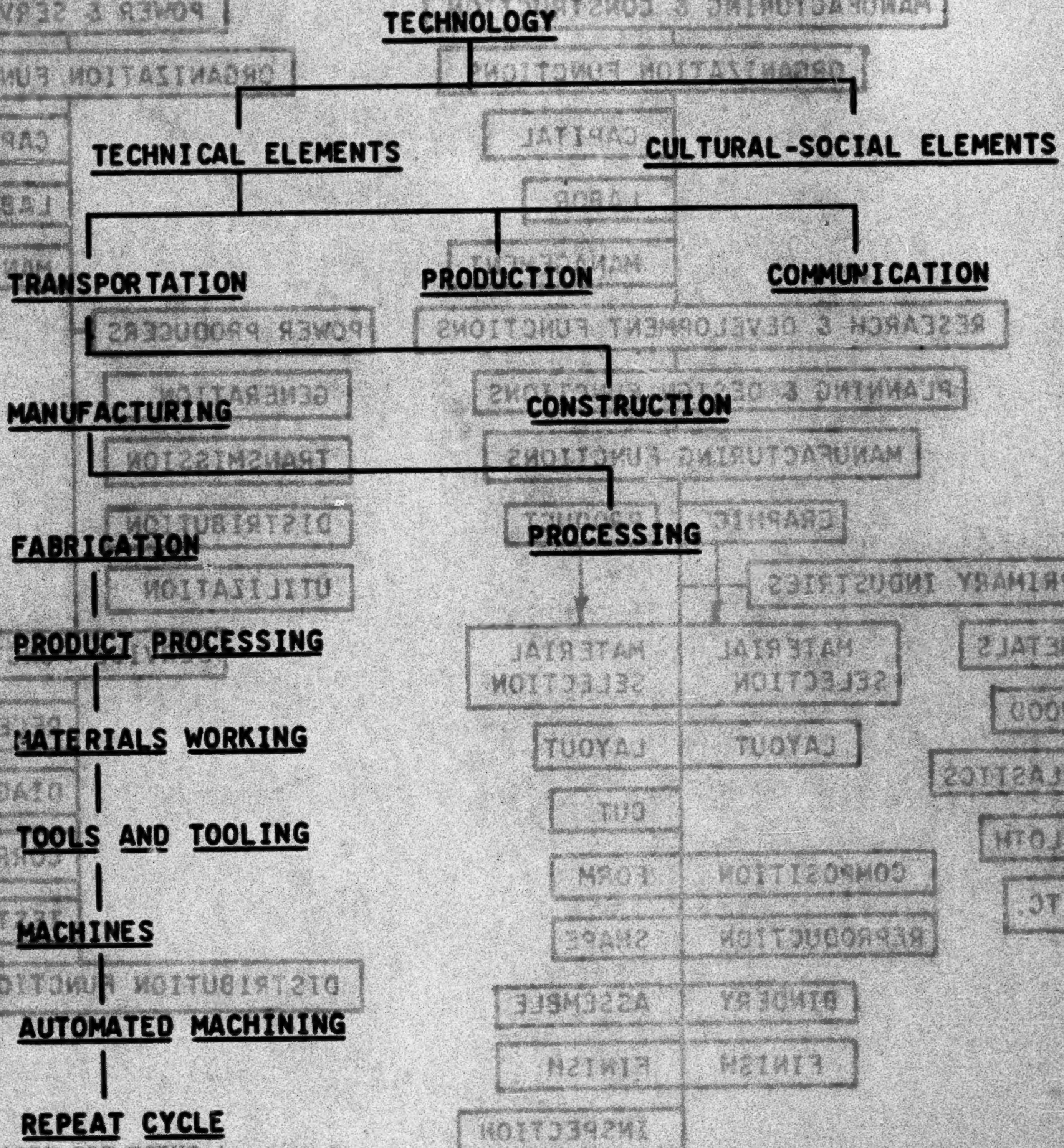
III. THE SENIOR HIGH SCHOOL (40 WEEKS)

GRADE 10	THE CONSTRUCTION INDUSTRIES THE ELECTRONIC INDUSTRIES
GRADE 11	THE POWER INDUSTRIES THE TRANSPORTATION INDUSTRIES
GRADE 12	THE SERVICES INDUSTRIES INDUSTRIAL MANAGEMENT
GRADES 10, 11, 12	RESEARCH AND DEVELOPMENT
GRADES 10, 11, 12	INDUSTRIAL ARTS RECREATION

Olson, Improving Industrial Arts Teaching, p. 26.

E

PROPOSED CURRICULUM STRUCTURE TO REFLECT TECHNOLOGY - DEVORE



TECHNOLOGY

TECHNICAL ELEMENTS

CULTURAL-SOCIAL ELEMENTS

TRANSPORTATION

PRODUCTION

COMMUNICATION

MANUFACTURING

CONSTRUCTION

PROCESSING

FABRICATION

PRODUCT PROCESSING

MATERIALS WORKING

TOOLS AND TOOLING

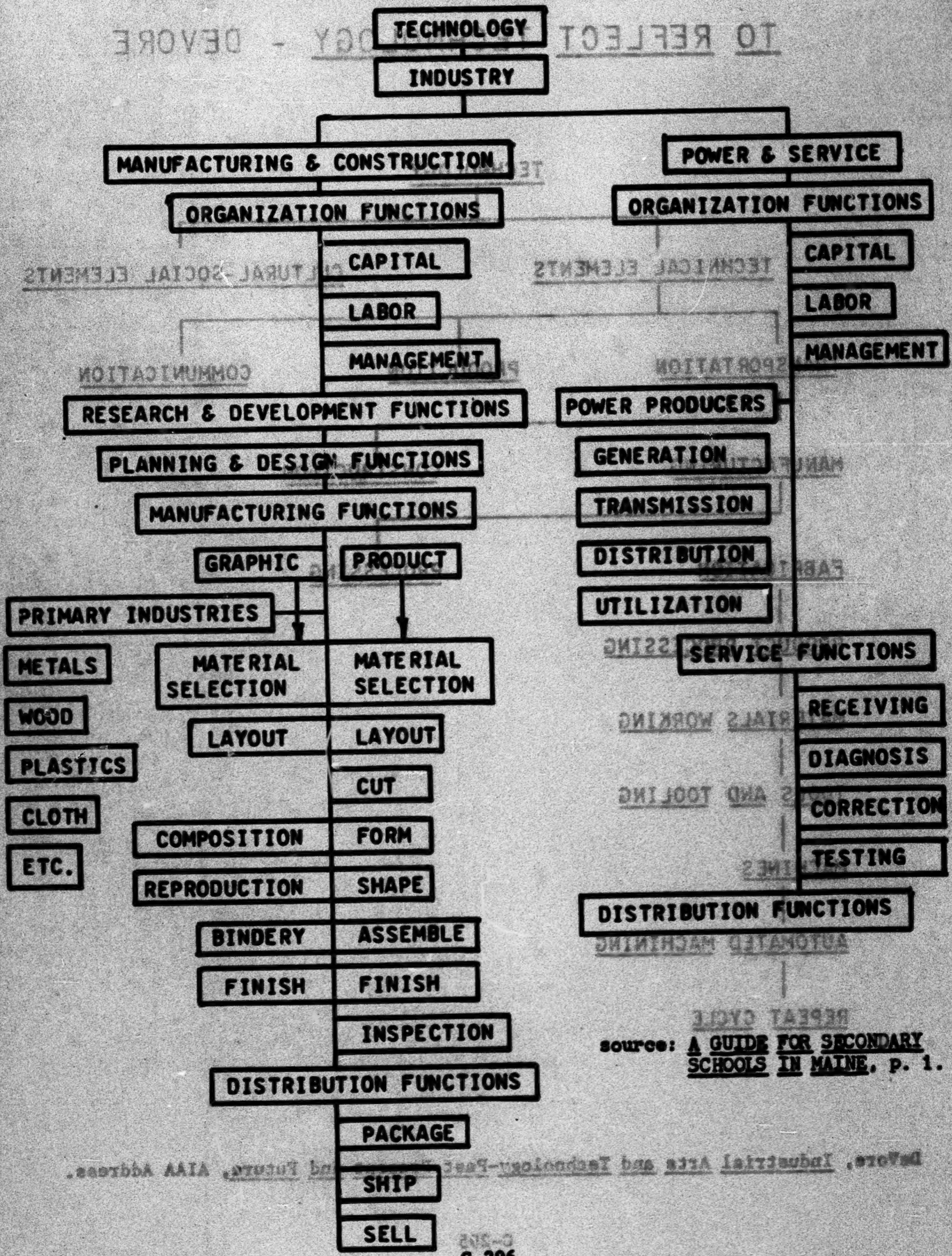
MACHINES

AUTOMATED MACHINING

REPEAT CYCLE

DeVore, Industrial Arts and Technology-Past Present and Future, AIAA Address.

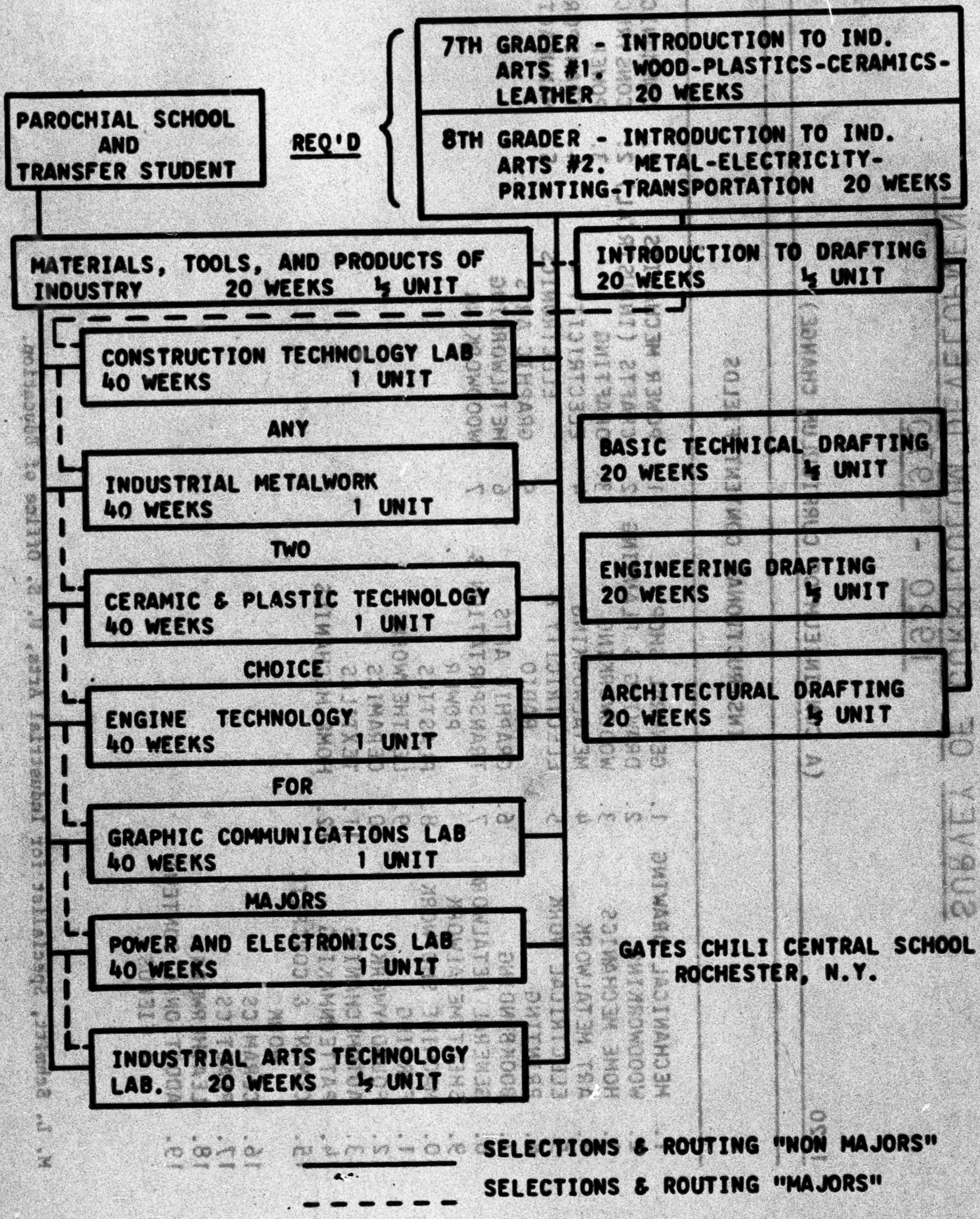
STATE OF MAINE CURRICULUM


TECHNOLOGY
INDUSTRY
MANUFACTURING & CONSTRUCTION
ORGANIZATION FUNCTIONS
CAPITAL
LABOR
MANAGEMENT
RESEARCH & DEVELOPMENT FUNCTIONS
PLANNING & DESIGN FUNCTIONS
MANUFACTURING FUNCTIONS
GRAPHIC
PRODUCT
PRIMARY INDUSTRIES
METALS
WOOD
PLASTICS
CLOTH
ETC.
MATERIAL SELECTION
MATERIAL SELECTION
LAYOUT
LAYOUT
CUT
COMPOSITION
FORM
REPRODUCTION
SHAPE
BINDERY
ASSEMBLE
FINISH
FINISH
INSPECTION
DISTRIBUTION FUNCTIONS
PACKAGE
SHIP
SELL
POWER & SERVICE
ORGANIZATION FUNCTIONS
CAPITAL
LABOR
MANAGEMENT
POWER PRODUCERS
GENERATION
TRANSMISSION
DISTRIBUTION
UTILIZATION
SERVICE FUNCTIONS
RECEIVING
DIAGNOSIS
CORRECTION
TESTING
DISTRIBUTION FUNCTIONS

source: A GUIDE FOR SECONDARY SCHOOLS IN MAINE, p. 1.

G

INDUSTRIAL ARTS - TECHNOLOGY CURRICULUM


PAROCHIAL SCHOOL AND TRANSFER STUDENT
REQ'D
7TH GRADER - INTRODUCTION TO IND. ARTS #1. WOOD-PLASTICS-CERAMICS-LEATHER 20 WEEKS
8TH GRADER - INTRODUCTION TO IND. ARTS #2. METAL-ELECTRICITY-PRINTING-TRANSPORTATION 20 WEEKS
MATERIALS, TOOLS, AND PRODUCTS OF INDUSTRY 20 WEEKS ½ UNIT
INTRODUCTION TO DRAFTING 20 WEEKS ½ UNIT
CONSTRUCTION TECHNOLOGY LAB 40 WEEKS 1 UNIT
ANY
INDUSTRIAL METALWORK 40 WEEKS 1 UNIT
TWO
CERAMIC & PLASTIC TECHNOLOGY 40 WEEKS 1 UNIT
CHOICE
ENGINE TECHNOLOGY 40 WEEKS 1 UNIT
FOR
GRAPHIC COMMUNICATIONS LAB 40 WEEKS 1 UNIT
MAJORS
POWER AND ELECTRONICS LAB 40 WEEKS 1 UNIT
INDUSTRIAL ARTS TECHNOLOGY LAB. 20 WEEKS ½ UNIT
BASIC TECHNICAL DRAFTING 20 WEEKS ½ UNIT
ENGINEERING DRAFTING 20 WEEKS ½ UNIT
ARCHITECTURAL DRAFTING 20 WEEKS ½ UNIT
SELECTIONS & ROUTING "NON MAJORS"
SELECTIONS & ROUTING "MAJORS"

GATES CHILI CENTRAL SCHOOL
ROCHESTER, N.Y.

SURVEY OF CURRICULUM DEVELOPMENT
1920 - 1970

1920 (A CONTINIEUM OF CURRICULUM CHANGE) 1970

INSTRUCTIONAL CONTENT FIELDS

1. MECHANICAL DRAWING
2. WOODWORKING
3. HOME MECHANICS
4. ART METALWORK
5 ELECTRICAL WORK
6. PRINTING
7. BOOKBINDING
8. GENERAL METALWORK
9. SHEET METALWORK
10. MACHINE SHOPWORK
11. FORGING
12. FOUNDRYWORK
13. AUTOMECHANICS
14. PATTERNMAKING
15. CEMENT & CONCRETE WORK
16. CERAMICS
17. PLASTICS
18. LEATHERWORK
19. ADDITIONAL CONTENT & FIELDS

1. GENERAL SHOP
2. DRAWING & PLANNING
3. WOODWORKING
4. METALWORKING
5 ELECTRICITY & RADIO
6. GRAPHIC ARTS
7. TRANSPORTATION & POWER
8. PLASTICS
9. LEATHERWORK
10. CERAMICS
11. TEXTILES
12. HOME MECHANICS

1. POWER MECHANICS
2. CRAFTS (INDUSTRIAL)
3. DRAFTING
4 ELECTRICITY - ELECTRONICS
5. GRAPHIC ARTS
6 METALWORKING
7. WOODWORKING

1. COMMUNICATIONS
2. CONSTRUCTION
3. POWER
4 TRANSPORTATION
5 MANUFACTURING

M. L. Schmitt, Specialist for Industrial Arts, U. S. Office of Education.

CURRICULUM CONSTRUCTION

PART II

(Seminar Unit - 19)

I. Introduction

One of the most important aspects of preparing curriculum materials for teaching is the development of resource units which the teacher may use in carrying out the course of study which is to be taught.

II. Nature of Resource Unit (2.97) (4:239) (Quote #1)

- A. Guide for teaching
  1. Outline of topics
  2. Suggested activities
  3. Resources and aids
- B. Units in good Curriculum organization
  1. Use in standard Industrial Arts course
     - a. Typical activities of Industrial Arts (A)
     - b. Units from industry
     - c. Combination of activity in industrial arts and units from industry to provide
       - (1) Continuity
       - (2) Sequence
       - (3) Integration
  2. Use in course or activity about industry (A)
     - a. Obtain continuity, sequence, and integration through simulated industrial enterprise
     - b. Select activity appropriate to concept or objective to be developed
     - c. Length of activity in terms of maturity (grade level) of students
     - d. Must relate to meaningful lab activity

III. Identifying Areas of Industry (5:Ch.IV) (1:12) (B)

- A. Categories for units
  1. Industrial relations
  2. Engineering in industry
  3. Production
  4. Labor
  5. Financial control
  6. Marketing
  7. Industrial economics
  8. Industrial organization and management
- B. Units or categories that could be developed under each area of industry (C)
  1. Develop list with students

IV. Developing Units

A. Characteristics of unit teaching (Quote #2)
   1. Introduction to the unit
   2. Determination of purposes
   3. Developmental activities
   4. Opportunities of individual work
   5. Culminating activities and evaluation

B. Essentials of a unit
   1. Development of the body of knowledge to be transmitted by the unit
   2. Segmentation of the body of knowledge into teachable portion (lesson plans)
   3. Presentation of activities to develop and reinforce understandings
   4. Resources essential to the development of understandings

C. Structuring the unit
   1. Introduction (D)
   2. Subordinate concepts and facts (E)
      a. Identifies body of knowledge
      b. Should be brief but complete

   3. Lessons (F)
      a. Skeleton plans with all major segments included
      b. Sufficient number to present body of knowledge

   4. Activities (G)
      a. Explanation of a number of activities which could be used
      b. Brief but complete explanation

   5. Resources (H)
      a. Bibliography of
         (1) Books, booklets, etc.
         (2) Films
         (3) Charts, diagrams

      b. Examples of visual aids which are recommended for the unit

Bibliography

1. Bateson, Willard and Stern, Jacob, "The Functions of Industry as the Basis for Industrial Education Programs", The Journal of Industrial Teacher Education, Vol. 1:1, p. 3-16.
2. Bakamis, William, Improving Instruction in Industrial Arts, Milwaukee, Bruce, 1966.
3. Maynard, H. B. (Chairman), Common Body of Knowledge. Association of Consulting Management Engineers, Inc., N.Y., 1957.
4. Krug, Edward A., Curriculum Planning. New York, Harper and Row, 1957.
5. Olson, Delmar, Industrial Arts and Technology. New Jersey, Prentice-Hall, 1963.
6. Thornton, James and Wright, John, Secondary School Curriculum. Columbus, Ohio, Charles Merrill, 1963.

Quote #1

A resource unit is an extensive collection of suggested learning activities and materials organized around a given topic, set of objectives (concept), or a series of problems. It is used to assist in the choice of learning activities and materials related to them. From the suggestions included in resource units, the teacher or teacher and students cooperatively, will choose those appropriate to the needs and interests and abilities of the students. Also, resource units are large units usually concerned with broad areas.

Resource units are usually prepared for teacher use only. The teacher may add to the unit by compiling a series of illustrative materials, film evaluations, community speakers, trips, examination questions, and other materials as suggested in the resource unit.

Thornton & Wright, Secondary School Curriculum, p. 55

Quote #2

The structure or outline of resource units has become fairly well established along the following lines:

- I Significance of the topic or area
- II Inventory of possible objectives (concepts)
- III Content outline
- IV Suggested activities
  - A. Introductory
  - B. Developmental
  - C. Culminating
- V Bibliographies and list of materials
- VI Suggested evaluation procedures

Krug, Curriculum Planning, p. 236.

Quote #3

A unit of instruction is:

1. a major subdivision of a course of study, a textbook, or a subject field, particularly a subdivision in the social studies, practical arts, or science.
2. An organization of various activities, experiences, and types of learning around a central problem, or purpose, developed cooperatively by a group of pupils under teacher leadership; involving planning.

Good,. Dictionary of Education, p. 587.

Quote #4

Teaching unit is defined as the organization of large numbers of learning experiences in terms of general themes of pupil interests and needs.

A resource unit is a collection of all the teaching aids which can be used in a learning unit. It contains all the suggestions for resources, materials, purposes, problems, projects, activities, bibliographies, etc., which could be of use to the teacher in teaching a unit.

Venable, Patterns in Secondary School Curriculum, p. 85.

Quote #5

Tyler laid down three criteria that are commonly used as standards for good curriculum organization:

1. continuity
2. sequence
3. integration

Beauchamp, Curriculum Theory, p. 41.

Quote #6

Unit teaching is characterized by definite steps involved in the teaching of each unit. The steps usually include these:

1. introduction to the unit
2. determination of purposes
3. developmental activities
4. opportunities of individual work
5. culminating activities and evaluation

Veneable, Patterns in Secondary School Teaching, p. 93.

CURRICULUM CONSTRUCTION

PART II

INDEX TO TRANSPARENCIES

A. Comparison of Industrial Arts Approaches

B. Major Areas of Industry

C. Suggested Categories for Development

D. Outline of Unit Structure

E. Subordinate Concepts and Facts

F. Lesson Topics

G. Activities

H. Resources

A

COMPARISON OF INDUSTRIAL ARTS APPROACHES

TYPICAL I.A. ACTIVITIES	ACTIVITIES ABOUT INDUSTRY
INTRODUCTION TO I.A.	INDUSTRY IN AMERICA 1. ECONOMIC EFFECTS 2. WORK OPPORTUNITIES
ASSIGN PERSONNEL PLAN	FORMS OF OWNERSHIP LEVELS OF MANAGEMENT OBTAINING EMPLOYMENT IN INDUSTRY
IDENTIFY PROJECT NEED	MARKET RESEARCH RESEARCH DEVELOPMENT
OBTAIN PARENT OR INSTRUCTOR'S PERMISSION	FINANCIAL PLANNING
DESIGN OR RE-DESIGN PROJECT	PRODUCT ENGINEERING
DEVELOP BILL OF MATERIALS	PRODUCTION PLANNING AND CONTROL
OBTAIN MATERIALS	PURCHASING
BUILD THE PROJECT, CHECK PROGRESS WITH INSTRUCTOR	PROCESS ENGINEERING MANUFACTURING QUALITY CONTROL
OBTAIN SPECIFIC INFORMATION OR SKILLS NECESSARY TO COMPLETE THE PROJECT	ON THE JOB TRAINING APPRENTICESHIP PROGRAMS
EVALUATION OF PROJECT AND STUDENT PROGRESS (STUDENT TEACHER RELATIONS)	MERIT RATING COLLECTIVE BARGAINING GRIEVANCE PROCEDURE WAGE & SALARY SCALES
PAY FOR PROJECT	CORPORATION FINANCE COST ACCOUNTING
TAKE THE PROJECT HOME	PACKAGING ADVERTISING DISTRIBUTION

B

MAJOR AREAS OF INDUSTRY

INDUSTRIAL RELATIONS

ENGINEERING IN INDUSTRY

PRODUCTION

LABOR

FINANCIAL CONTROL

MARKETING

INDUSTRIAL ECONOMICS
INDUSTRIAL ORGANIZATION
AND MANAGEMENT

SUGGESTED CATEGORIES FOR DEVELOPMENT

INDUSTRIAL RELATIONS	EMPLOYMENT WAGES & SALARY LABOR RELATIONS EMPLOYEE WELFARE
ENGINEERING	RESEARCH & DEVELOPMENT PRODUCT ENGINEERING MANUFACTURING ENGINEERING PLANT ENGINEERING
PRODUCTION	PRODUCTION PLANNING & CONTROL QUALITY CONTROL PURCHASING MANUFACTURING PLANT LAYOUT & DESIGN
LABOR	UNION ORGANIZATION & FUNCTIONS COLLECTIVE BARGAINING APPRENTICESHIP PROGRAMS GRIEVANCE PROCEDURES
FINANCIAL CONTROL	FINANCIAL PLANNING GENERAL ACCOUNTING COST ACCOUNTING
MARKETING	MARKET RESEARCH ADVERTISING DISTRIBUTION PRODUCT SERVICE PACKAGING
INDUSTRIAL ECONOMICS, **INDUSTRIAL ORGANIZATION,** **INDUSTRIAL MANAGEMENT**	ROLE OF "PROFIT" IN OUR ECONOMY FORMS OF OWNERSHIP SOURCES OF CAPITAL ECONOMIC SYSTEMS FUNCTION OF MANAGEMENT LEVELS OF MANAGEMENT ORGANIZATION STRUCTURE

AREA: ______________________

CATEGORY: ______________________

CONCEPTUAL STATEMENT: ______________________

Subordinate Concepts & Facts	Lessons	Activities	Resources

D

E

AREA: Industrial Relations
CATEGORY: Employment
CONCEPTUAL STATEMENT: When industries effectively use employment procedures desirable employees may be selected according to employer needs and employee interest and ability.

I SUBORDINATE CONCEPTS & FACTS

A. Individuals who apply for specific jobs should be aware of the education and skill requirements before applying.

B. Worker's attitude, cooperation, ability to accept and adapt to change, willingness to work with others are key ingredients for occupational success.

C. Applicants who apply for jobs according to prescribed procedures are more likely to be successful in acquiring the job than those who do not follow said procedures.

D. Individual employee productive contribution must exceed the direct and indirect remunerations he receives.

F

II **LESSON TOPICS**

- A. Employment Procedures
- B. Preparing Applications
- C. Employment Testing
    - 1. Manual Dexterity
    - 2. Specific Skills
    - 3. Personality
    - 4. Occupational Interest
    - 5. Others
- D. Interviewing

III ACTIVITIES

A. Develop and administer manual dexterity tests with students.

B. Develop and administer testing to evaluate manual skill ability for a particular job.

C. Have students fill out a standard application form for a specific industrial job.

D. Have students apply for a specific job that must be done (during a production unit). Each student would be interviewed and considered in light of his interests and experience and the needs of the program. Interviewers could be older students, the teacher, or other industrial arts teachers.

E. Cause the students to become familiar with occupational reports and handbooks.

IV RESOURCES

A. Books

1. Amrine and others, Manufacturing Organization and Management (2nd edition)

B. Periodicals

1. U. S. Dept. of Commerce, Survey of Current Business

C. Films

1. "Employment Interview"

D. Others

1. Examples

2. Visuals

3. Speakers

REVIEW AND EVALUATION OF RESOURCE UNITS

(Seminar Unit - 20)

I. Introduction

Each committee shall develop approximately three to five resource units. These will be duplicated and all participants shall receive copies of the units completed by the other committees. When all units have been completed, each committee shall present a brief review of its work (30 - 45 minutes) to the whole group.

This is an important phase of the program which gives each participant a general understanding of all resource units developed, the committees rational for selecting each unit topic and emphasizes the most important units and activities developed.

II. Committees Duplicate and Submit all Completed Units to Project Staff for Review

- A. Each committee shall develop three to five resource units
- B. Review first unit with project staff before duplication

III. Project Staff Reviews All Resource Units

- A. Staff makes marginal notes on its copies regarding questions to be asked and discussed during committee presentations

IV. Committees Present Their Units to All Participants

- A. Staff explains importance of committee presentation
  1. Understanding of all material developed
  2. Understanding of rational of unit selection by committee
  3. Emphasis on important topics and activities
- B. Participants presentation
  1. Selection of unit topics (rational)
  2. Major concepts (why important)
  3. Suggested lesson topics
  4. Activities
  5. Special resources
  6. Inform all of any corrections, deleations or omissions
  7. Accept and discuss all questions and comments from other participants and project staff member
- C. Seminar discussion - staff and students
  1. Appropriate level of use
  2. Nature of activities included
  3. Appropriate resources identified

STUDENT EVALUATION OF FIELD STUDY PROGRAM

(Seminar Unit - 21)

I. Introduction

It is important to evaluate this program frequently and to make use of as many resources as possible in doing so. One of the most important sources of information is the participants themselves. This outline indicates the summarization procedure used by the project staff with the students in acquiring a useful critique of the Field Study program.

II. Students Review Notes Taken During All Phases of Program

III. Each Student Completes a detailed Student Evaluation Form on All Phases of the Program

A. Evaluation form to be completed by students is distributed middle of last week

IV. Sections and Topics to be Included in Evaluation Form

A. Phase I
1. General orientation to program
2. Orientation seminars
    a. Industrial Economics
    b. Industrial Psychology
    c. Industrial Sociology
    d. Etc.

3. Films
4. Text and other resource materials

B. Phase II (off campus)
1. Monday Seminars
2. Observation and study period in industry
3. Friday Seminars

C. Phase III (on campus)
1. Culminating seminars
    a. Curriculum development
    b. Resource unit development
2. Construction of resource units
3. Evaluation of resource units

V. Student Evaluation Form Reviewed and Analyzed by Project Staff

VI. Project Staff Discusses with Students the Analysis of Student Reactions and Comments Received

A. Suggestions for change are made by both parties on major points identified